

# RANI A. KADY

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## Education

### **Ph.D., Industrial & Systems Engineering, Auburn University, 2008**

Dissertation: “The Development and Representation of Human Performance Characteristics in Evacuation Models”

Advisor: Jerry Davis, Ph.D., CPE, CSP

### **M.S., Industrial Engineering Technology, East TN State University, 2002**

Thesis: “Implementing Theory of Constraints and Pull System Concepts for Re-engineering the Operational System to Enhance the Customer Orientation of a Mid-size Firm”

Advisor: Andrew J. Czuchry, Ph.D., AFG Industries Chair of Excellence

### **B.S., Industrial Engineering, The University of Jordan, 1999**

## Publications

### Forthcoming

1. **Kady, R.**, Gwynne, S., & Davis, J. (in press). The incorporation of empirical crawling data into the building EXODUS model. *Journal of Safety Science*.
2. **Kady, R.** & Davis, J. (in press). Cost analysis and budgeting for ergonomic hazard & repetitive strain. *Book chapter to appear in the ASSE Safety Handbook*, Des Plaines, IL.
3. Yasin, M., Czuchry, A., & **Kady, R.** (in press). Re-engineering organizational practices and processes to improve the customer focus of a marketing organization. *Advances in Competitiveness Research*.

### In review

- **Kady, R.**, & Davis, J. (in review). The development and representation of occupant movement data in building evacuation models. *Fire Technology*.

### In preparation

- Tubbs, J. & Meacham, B. (2007). Egress design solutions: A guide to evacuation and crowd management planning. Reviewed by **Kady, R.** *Book review to appear in Fire Technology*.

### Refereed conference papers

1. Gwynne, S., **Kady, R.**, Davis, J. (2007). Development and validation of crawling model in existing computational egress tool. *Proceedings of the 11<sup>th</sup> International Conference on Fire Science and Technology* (Interflam 2007). London, UK, September 3-5, 2007.

2. **Kady, R.**, & Davis, J. (2007). Helping safety managers make project decisions in the workplace: The weighted scoring decision making approach. *Proceedings of the American Society of Safety Engineers Professional Development Conference (Safety 2007)*. Orlando, FL, June 25-27, 2007.
3. **Kady, R.**, Davis, J., & Blackburn, T. (2006). Improving occupant characteristics in performance-based evacuation modeling. *Proceedings of the Human Factors and Ergonomics Society 50<sup>th</sup> Annual Meeting*. San Francisco, CA, October 16-20, 2006.
4. **Kady, R.**, Garrett, A., Agarwal, R., Dozier, G., & Umphress, D. (2006). The application of evolutionary computation in evacuation planning. *Proceedings of the 9th International IEEE Conference on Intelligent Transportation Systems*. Toronto, Canada, September, 17-20.
5. Garrett, A., Carnahan, B., **Kady, R.**, Davis, J., Dozier, G., SanSoucie, M.P., Hull, P.V., & Tinker, M.L. (2006). Evacuation planning via evolutionary computation. *The IEEE World Congress on Computational Intelligence*. Vancouver, BC, Canada, July, 16-21. Note: **Session best paper award**.
6. **Kady, R.** (2006). Evacuation modeling: Development, characteristics, and limitations. *Proceedings of the 4th Annual Regional National Occupational Research Agenda (NORA) for Young/New Investigators*. University of Utah, Salt Lake City, UT, April 20-21.
7. Czuchry, A., **Kady, R.**, & Yasin, M. (2005). Enhancing the customer orientation of operational practices: A field study. *36<sup>th</sup> Annual Meeting of the Decision Sciences Institute*, San Francisco, CA, November 19-23.

### **Invited presentations**

1. "Evacuation models with a focus on human performance and behavior on stairs," *Graduate Seminar, Department of Industrial & Systems Engineering*, Auburn University, June 2005.
2. "Evacuation modeling: An overview presentation," *Research Symposium, Deep South Center for Occupational Health & Safety*, Auburn University, May 2005.

### **Poster sessions**

1. Gray, M., **Kady, R.**, Walker, S. (2006). An integrated behavior-based safety model for manufacturing: A unit approach. *The American Society of Safety Engineers Professional Development Conference (Safety 2006)*. Seattle, WA, June 11-14.
2. **Kady, R.** (2005). An introduction to evacuation modeling. *Institute of Industrial Engineers 4<sup>th</sup> Annual Doctoral Colloquium*. Atlanta, GA, May 15-17.

### **Abstracts**

1. **Kady, R.**, & Davis, J. (2007). Cost analysis and budgeting for ergonomic and safety interventions: A management approach. *Submitted to the American Society of Safety Engineers Professional Development Conference (Safety 2008)*. Las Vegas, NV, June 9-12.
2. Davis, J., **Kady, R.**, & Piper, A. (2007). Safety training program for student competition teams. *In preparation for submission to the Academic Forum at the American Society of Safety Engineers Professional Development Conference (Safety 2008)*. Las Vegas, NV, June 9-12.

## Grants

### Funded

- **Kady, R.** “The effect of occupant characteristics on the development of a density-speed relationship for crawling in evacuation.” Society of Fire Safety Engineers, \$3,027 (July 2007)

### Submitted

1. Davis, J., & **Kady, R.** “The impact of window dimensions on first responders safety.” Department of Homeland Security (DHS), \$181,124 (January 2007).
2. Davis, J., Dozier, G., & **Kady, R.** “Modeling human behavior in counterflow evacuation.” NIST, \$75,870 (March 2005).

## Awards & Scholarship

1. NIOSH Training Fellowship, Deep South Center for Occupational Health & Safety , 2005 - present
2. Public Risk Management Association (PRIMA) Student Scholarship, 2007
3. Dr. John Beno Memorial Scholarship, PRIMA, 2006
4. Alpha Pi Mu, Industrial Engineering Honor Society, 2006 - present
5. Delmar E. Tally Professional Development Award, American Society of Safety Engineers, 2005
6. Outstanding Academic Award, East TN State University, 2001 and 2002
7. Ministry of Education Fellowship, The University of Jordan, 1994 - 1999

## Coursework

Human Factors Engineering	Safety Engineering II (System Safety)
Simulation Modeling and Analysis	Project Management (Master’s level)
Advanced Engineering Statistics	Operations Research II (Master’s level)
Off-line and On-line Quality Control	Advanced Safety Engineering (Behavior-based Safety)
Reliability Engineering	Ergonomics I
Manufacturing and Production Economics	Ergonomics II (Biomechanics)
Manufacturing Systems Design and Analysis	Advanced Ergonomics III (Ergonomics Standards)
Lean Production	Industrial Hygiene and Environmental Hazards
Information Technology for Operations	Research Methods for Occupational Safety & Ergo
Linear Programming and Network Flows	Occupational Safety & Ergonomics Forum
Adaptive Optimization (Audited)	Survey Research Methods
Safety Engineering I (Occupational Safety)	Graduate Seminar

## Research interests

- Emergency evacuation and modeling

The ongoing trend of advanced knowledge in building designs and structures has raised major concerns of occupant safety. Evacuation models are needed to understand and assess these designs to assure occupant safety and verify building compliance with standards and guidelines. The lack of real evacuation data poses a challenge to the development and representation of occupant movement and behavior in evacuation models. My research focuses on bridging the gap between the development and representation of occupant performance and behavior data in evacuation models and implementing optimization techniques to layout designs.

- System safety

The application of engineering and management methods and techniques to identify, eliminate, and control hazards and risks in industrial systems.

- Ergonomics and work measurement

Studying the impact of ergonomics & work measurements on productivity & cost/benefit analyses.

## Research projects

Project	Roles and Responsibilities (contribution percentage)
Samuel Ginn College of Engineering Safety Program (Student Competition Teams)	<ul style="list-style-type: none"><li>• Identify and review status of university student safety programs at other universities and colleges (30%)</li><li>• Develop a process to identify existence and activation of student team early in competition cycle (10%)</li><li>• Identify hazards and risks associated with student team project (25%)</li><li>• Design and develop online training materials (modules) including test questions (quizzes), power point slides, and scripts (10%)</li><li>• Develop program policies, procedures, and case study (30%)</li><li>• Develop and maintain course website (100%)</li></ul>
Alabama Mental Health Pharmacy Service	<ul style="list-style-type: none"><li>• Developed and analyzed work measurements and time studies for AL mental health pharmacists (50%)</li><li>• Developed a technical report with statistical analyses and interpretations of the findings (75%)</li><li>• Developed and demonstrated instructions and data collection forms to pharmacists and technicians (75%)</li></ul>
Safety in the Logging Woods: Visual Guide to Landing Safety	<ul style="list-style-type: none"><li>• Designed scenarios (wordless warning signs) to describe hazards result in serious injury or fatality including communication, loader, maintenance, and chainsaw (50%)</li></ul>

## Certifications & memberships

- Associate Safety Professional (ASP No. A12942), April 2006 - present
- OSHA Thirty-Hour General Industry Training Course, January 2005 - present
- OSHA Ten-Hour General Industry Training Course, January 2005 - present
- Student member of the Institute of Industrial Engineers (IIE)
- Student member of the American Society of Safety Engineers (ASSE)
- Student member of the Society of Fire Protection Engineers (SFPE)
- Student member of Society of System Safety (SSS)

## Employment

### Teaching

01/2004 – 12/2005: Instructor, Academic Support and Samuel Ginn College of Engineering, Auburn University, Auburn: *Developed and taught a university-level course in success strategies for freshmen engineering students*

### Graduate teaching assistant

08/2002 – 12/2003 & 01/2006 – present: Industrial and Systems Engineering Department, Auburn University, Auburn

Semester/ Year	Course Title (level and # students/level) U-Undergraduate/G-Graduate/O-Outreach	Roles and Responsibilities (contribution percentage)
Fall/07	INSY 7060 Ergonomics I (42 G / 12 O)	<ul style="list-style-type: none"><li>• Prepare and teach lectures on cost/benefit analysis of ergonomic interventions (100%)</li><li>• Grade homework assignments and projects (50%)</li><li>• Maintain course website (100%)</li></ul>
Sp./07	INSY 7020 System Safety Engineering (14 U / 5 G / 9 O)	<ul style="list-style-type: none"><li>• Prepared and lectured on probability &amp; statistics review, network analysis, Boolean algebra, fault tree analysis, cut &amp; path sets, and weighted scoring decision making (100%)</li><li>• Designed and coordinated class projects (50%)</li><li>• Designed test problems and homework questions (50%)</li><li>• Graded homework, quizzes, projects, and tests (50%)</li><li>• Maintained course website (100%)</li></ul>
	INSY 3020 Occupational Safety & Ergo. (52 U / 12 O)	<ul style="list-style-type: none"><li>• Prepared and taught lectures on fire safety and evacuation (75%)</li><li>• Designed test questions and proctored exams (25%)</li><li>• Maintained course website and grades (100%)</li></ul>
Fall/06	INSY 6010 Safety Engineering I (26 G / 13 O)	<ul style="list-style-type: none"><li>• Prepared and taught lectures on fire safety (protection &amp; prevention) and building evacuation modeling (75%)</li><li>• Supervised and coordinated class projects (50%)</li><li>• Designed and assigned class project to 3 graduate students (75%)</li><li>• Designed and graded exams and homework assignments (50%)</li></ul>
Sp./06	INSY 3021 Methods Eng., Work Measurement, and Ergonomics Lab (40 U)	<ul style="list-style-type: none"><li>• Prepared and taught lab lectures (50%)</li><li>• Supervised and conducted lab experiments (50%)</li><li>• Graded lab assignments and reports (25%)</li><li>• Maintained course website and grades (100%)</li></ul>
	INSY 3020 Occupational Safety & Ergo. (U 50/1G/12 O)	<ul style="list-style-type: none"><li>• Prepared and taught lectures on fire safety and evacuation (75%)</li><li>• Designed test questions and proctored exams (50%)</li><li>• Maintained course website and grades (100%)</li></ul>
Fall/03	INSY 3800 Manufacturing Processes & Lab (50 U)	<ul style="list-style-type: none"><li>• Designed and taught lab experiments (50%)</li><li>• Graded homework, lab assignments, and exams (50%)</li></ul>
Sp./03	STAT 3600 Probability & Statistics I (40 U)	<ul style="list-style-type: none"><li>• Graded daily homework (50%)</li><li>• Conducted study sessions (50%)</li></ul>
Fall/02	INSY 4330 Statistical Quality Design & Control (30 U)	<ul style="list-style-type: none"><li>• Graded homework assignments (50%)</li><li>• Conducted study sessions (50%)</li></ul>

## **Internship**

09/2001 – 05/2002: Industrial Engineer, Bristol Metals, LLC, Bristol, TN:

- Managed and scheduled stainless piping production system
- Evaluated productivity and cost estimates
- Implemented manufacturing and managerial concepts
- Designed database information system for production, inventory, and quality control

## **Services**

### **To the profession**

1. Davis, J., **Kady, R.**, & Piper, A. (2007). Participated in developing and implementing Samuel Ginn College of Engineering safety training program for student competition teams, Auburn University, AL.
2. Davis, J., & **Kady, R.** (2007). Participated in teaching OSHA Ten-Hour General Industry Courses as a component of the INSY 3020 and ENH 670 (University of Alabama at Birmingham-UAB) courses. 48 undergraduate students and 11 graduate students successfully completed the course and received official ten-hour training cards from the Occupational Safety and Health Administration (OSHA). 590 total training hours.
3. Davis, J., **Kady, R.**, Piper, A. (2006). Participated in teaching OSHA Thirty-Hour General Industry Course to 55 INSY undergraduate & graduate students. 55 students successfully completed the course and received official thirty-hour training cards from the Occupational Safety and Health Administration (OSHA). 1650 total training hours.
4. Davis, J., & **Kady, R.** (2006). Participated in teaching OSHA Ten-Hour General Industry Course as a component of the INSY 3020/7970/7976 & ENH 670 (UAB) courses. 54 undergraduate students and 13 graduate students successfully completed the course and received official ten-hour training cards from the Occupational Safety and Health Administration (OSHA). 670 total training hours.
5. Davis, J., **Kady, R.**, & Piper, A. (2005). Participated in developing and teaching a twenty-hour system safety course “An Introduction to Systems Safety for Engineers” for the Deep South Center for Occupational Health and Safety at ACIPCO, Birmingham, AL. 29 attendees. Rated 3.8 of 5.0. 464 total training hours.
6. Reviewed for the IEEE-Intelligent Transportation Systems Society (ITSS) Conference, 2007.
7. Served on the American Society of Safety Engineers (ASSE) Fire Prevention Committee to develop and produce fire safety information for students living on- and off-campus, 2005.

### **Outreach**

- Organized and coordinated the Occupational Safety & Ergonomics activities for:
  - Eday, Samuel Ginn College of Engineering, Auburn University, AL.
  - The Civil Air Patrol (CAP) Cadet Program
  - The annual Teams and Individuals Guided by Engineering Resources (TIGERs) camp

## **Training courses**

1. Principles and Practices of Evacuation Modeling Course, University of Greenwich, London, UK, 2005.
2. Emergency Evacuation Workshop, National Fire Protection Association (NFPA), Atlanta, GA, 2005.
3. People-Based Safety: The Human Dynamics of Achieving an Injury-free Workplace, American Society of Safety Engineers Professional Development Conference, New Orleans, LA, 2005.

## **References**

Available upon request.