

BIOGRAPHICAL SKETCH

NAME Yan Xiao, PhD		POSITION TITLE Associate Professor and Research Section Director	
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Lanzhou Railroad Institute, Lanzhou, China	BS	1982	Mechanical Engineering
Beijing Institute of Technology, Beijing, China	MS	1985	Systems Engineering
University of Toronto, Toronto, Canada	PhD	1994	Human Factors

Positions

- 1985 Systems Engineer, North Vehicle Research Institute, Beijing, China
1991 Doctoral Fellow, IBM Canada Centre for Advanced Studies Toronto, Canada
1994 Research Associate, Industrial Engineering, University of Toronto, Toronto, Canada
1994 Instructor of Anesthesiology, Anesthesiology, University of Maryland, Baltimore
1995 Assistant Professor of Anesthesiology, University of Maryland, Baltimore
1994 Humans Factors Engineer, University of Maryland, Baltimore
1997 Affiliate Assistant Professor of Information Systems, University of Maryland Baltimore County
1998 Associate Member, Graduate School University of Maryland
2000 Special Member, Graduate Faculty University of Maryland Smith School of Business
2001 Associate Professor (with tenure), University of Maryland, Baltimore
2005 Director, Research in Patient Safety, Program in Trauma, University of Maryland, Baltimore

Recent honors

- 1998 Invited Speaker, NATO, Symposium on Collaborative Crew Performance
1998 Best Abstract, Society of Technology for Anesthesia Meeting
2001 Best Abstract, Society of Technology for Anesthesia Meeting

Federal Government Public Advisory Committee Membership

- National Science Foundation CISE Grants Review Panel ('00-03)
National Science Foundation CISE Career Awards Review Panel ('02)
NASA/SBIR Smart Medicine Systems Review Panel ('02-'03)

A. Selected publications (in chronological order). (representative of over 80 publications)**Journal Articles**

- Mackenzie, C.F., Martin, P., **Xiao, Y.**, & The LOTAS Group. Video analysis of prolonged uncorrected esophageal intubation, *Anesthesiology*, 84(6):1394-1503. 1996.
- Xiao, Y.**, Hunter, W.A., Mackenzie, C.F., Jeffries, N.J., Horst, R., & LOTAS Group. Task complexity in emergency medical care and its implications for team coordination. *Human Factors*, 38(4):636-645. 1996.
- Xiao, Y.**, Milgram, P., & Doyle, D.J. Planning behavior and its functional roles in the interaction with complex systems. *IEEE Trans. Syst., Man, and Cyb., Part A: Systems and Humans*, 27(3):313-324. 1997.
- Xiao, Y.**, Mackenzie, C.F., Orasanu, J., Spencer, R., Rahman, A., Gunawardane, V., & The LOTAS Group. Information acquisition from audio-video-data sources: An experimental study on remote diagnosis. *Telemedicine J.*, 5(2):139-155. 1999.
- Xiao, Y.**, & Vicente, K. A framework for epistemological analysis in empirical (laboratory and field) studies. *Human Factors*, 42(1): 87-101. 1999.
- LaMonte, M.P., **Xiao, Y.**, Mackenzie, C.F., Hu, P., Gaasch, W., Cullen, J., & Gagliano, D. Tele-BAT: Mobile telemedicine for the brain attack team. *J. Stroke & Cerebrovascular Diseases*, 9(3):May-June, 128-135, 2000
- Xiao, Y.**, Gagliano, D., LaMonte, M., Hu, P., Gaasch, W., Gunawadane, R., & Mackenzie, C.F. Design and evaluation of real-time mobile telemedicine system for ambulance transport. *J. High Speed Networks*, 9:47-56. 2000
- Moss, J., **Xiao, Y.**, & Zubaidah, S. The operating room charge nurse: Coordinator and communicator. *JAMIA*, 9(6 suppl):S70-S74, 2002

9. Mackenzie, C. F., Hu, P., **Xiao, Y.**, & Seagull, J.F. Video acquisition and audio system network (VAASNET) for analysis of workplace safety performance. *Biomedical Instrumentation and Technology*. 37(4): 285-291. 2003
10. Mackenzie, C.F., & **Xiao, Y.** Video techniques and data compared with observation in emergency trauma care. *Quality Safety Health Care*. 12:ii51-57. 2003.
11. **Xiao, Y.**, Seagull, F.J., Mackenzie, C.F., & Klein, K.K. Adaptive Leadership in Trauma Resuscitation Teams: A Grounded Theory Approach to Video Analysis. *Cognition, Technology, and Work*. (6)158-164, 2004
12. Moss, J. & **Xiao, Y.** Improving Operating Room Coordination: Communication Pattern Assessment. *J. Nursing Administration*, 34(2):93-100, 2004
13. Dexter, F., Epstein, R.H., Traub, R.D., & **Xiao, Y.** Making Management Decisions on the Day of Surgery Based on Operating Room Efficiency and Patient Waiting Times. *Anesthesiology*, 101(6): 1444-1453, 2004
14. LaMonte M.P., **Xiao Y.**, Hu, P.F., Gagliano DM, Bahmouth, MN, Gunawardane RD, Mackenzie CF, Gaasch WR, & Cullen J. Shortening time to stroke treatment using ambulance telemedicine: TeleBAT. *J Stroke*. 13(4): 148-154. 2004
15. **Xiao, Y.**, Seagull, F.J., Nieves-Khouw, F., Barczak N., & Perkins, S. Organizational-Historical Analysis of the "Failure to Respond to Alarm" Problem. *IEEE Trans. on Syst., Man, and Cyb., Part A: Systems and Humans*, 34(6), 772-778. 2004
16. **Xiao, Y.** & Mackenzie, C.F. Introduction to the special issue on Video-based research in high risk settings: methodology and experience. *Cognition, Technology & Work*, 6:127-130. 2004
17. Mackenzie, C.F., **Xiao, Y.**, & Horst, R.. Video task analysis in high performance teams. *Cog.,Tech., and Work*. 6:139-147. 2004
18. Seagull, F.J., **Xiao, Y.**, & Plasters, C. Information Accuracy and Sampling Effort: A Field Study of Surgical Scheduling Coordination. *IEEE Trans. on Syst., Man, and Cyb., Part A: Systems and Humans*. 24(6), 764-771. 2004
19. **Xiao Y.**, Hu, P, Hu H, Ho D, Dexter F, Mackenzie CF, Seagull FJ, Dutton D. Algorithm for Processing Vital Sign Monitoring Data to Remotely Identify Operating Room Occupancy in Real-Time. *Anesthesia & Analgesia*. 101(3):832-929. 2005
20. **Xiao, Y.** Artifacts and Collaborative Work in Healthcare: methodological, theoretical, and technological implications of the tangible. *J. Biomedical Informatics*, 38(1):26-33. 2005.
21. Lu YC, **Xiao Y**#, Sears A, Jacko J. A Review and a Framework of Handheld Computer Adoption in Healthcare. *Int. J. Medical Informatics*. 74(5):709-722. 2005.
22. **Xiao Y**, Kim YJ, Gardner SD, Faraj S, Mackenzie CF. Communication Technology in Trauma Centers: A National Survey. *J. Emergency Medicine*. In press.
23. **Xiao Y**, Seagull FJ. Emergent CSCW Systems: The Resolution and Bandwidth of Workplaces. *Int. J. Med. Inform.*. In press.
24. Guzzo, J.L, Seagull FJ, Bochicchio GV, Sisely A, Mackenzie CF, Dutton R, Scalea T, & **Xiao Y.** Multiple Operators During Central Line Placement in the Trauma Resuscitation Unit: Videotape Review of Maximum Barrier Precautions. *Surgical Infections*. In Press.
25. Seagull FJ, Mackenzie CF, **Xiao Y**, Bochicchio GB. Video-based Ergonomic Analysis to Evaluate Toracostomy Tube Placement Techniques. *J. Trauma*. In press.

Proceeding Articles (Peer Reviewed)

1. **Xiao, Y.**, Mackenzie, C.F., & the LOTAS Group . Decision Making in Dynamic Environments: Fixation Errors and Their Causes. *Proc. Human Factors and Ergonomics 39th Ann. Mtg*, pp. 469-473 , 1995.
2. **Xiao, Y.**, & Mackenzie, C. F. Uncertainty in trauma patient resuscitation. *Proc. Hum.Fac. Erg. 41th Ann. Mtg*, pp. 168-172, 1997.
3. Gagliano, D., & **Xiao, Y.** Mobile Medicine Testbed. *Proc. American Medical Informatics Assoc. Ann. Symp.*, pp. 383-387, 1997.
4. **Xiao, Y.**, Mackenzie, C.F., Orasanu, J., Spencer, R., Gunawardane, V., & The LOTAS Group. Visual scanning patterns during remote diagnosis. *Proc. Human Factors and Ergonomics 42nd Ann. Mtg*, pp. 272-276, 1998.
5. **Xiao, Y.**, Mackenzie, C.F., Patey, R., & LOTAS Group. Team coordination and breakdowns in a real-life stressful environment. *Proc. Human Factors and Ergonomics 42nd Ann. Meeting*, pp. 186-190, 1998.
6. **Xiao, Y.**, & Mackenzie, C.F. Micro-theory methodology in critical incident analysis. *Proc. IEEE Int. Conf. on Sys., Man, and Cyb.*, pp. 2545-2550, 1998.
7. Seagull, F.J., **Xiao, Y.**, Mackenzie, C.F., Jaber, M., & Dutton, R. Monitoring behavior: a pilot study using an ambulatory eye-tracker in surgical operating rooms. *Proc. Human Factors and Ergonomics 43rd Ann. Mtg.*, pp. 850-854, 1999.
8. **Xiao, Y.**, & Seagull, F.J. An analysis of problems with auditory alarms: defining the roles of alarms in process monitoring tasks. *Proc. Human Factors and Ergonomics 43rd Ann. Mtg.*, pp. 256-260, 1999.
9. Seagull, F.J., **Xiao, Y.**, Mackenzie, C.F., & Wickens, C.D. Auditory alarms: From alerting to informing. *Proc. IEA 2000/HFES 2000 Congress*, Vol 1, pp. 223-226, 2000.
10. **Xiao, Y.** Mackenzie, C.F., Seagull, F.J., & Jaber, M. Managing the Monitors: An Analysis of Alarm Silencing Activities During An Anesthetic Procedure. *Proc. IEA 2000/HFES 2000 Congress*, Vol. 4, pp. 250-253, 2000.
11. **Xiao, Y.**, Lasome, C, Moss, J, Mackenzie, C.F. & Faraj, S. Cognitive Properties of a Whiteboard: A Case Study in a Trauma Centre. In W. Prinz, M. Jarke, Y. Rogers, K. Schmidt, and V. Wulf (eds.), *Proc. the Seventh European Conference on Computer-Supported Cooperative Work*, Bonn, Germany., Kluwer Academic Publishers, 259-278, 2001

12. **Xiao, Y.**, & Moss, J. Practice of High Reliability Teams: Observations in Trauma Resuscitation. *Proc. Human Factors and Ergonomics Society 44th Ann. Mtg.*, p. 395-399, 2001.
13. **Xiao, Y.**, Seagull, F.J., Mackenzie, C.F., Klein, K., Ziegert, J. (2002). Adaptation of team structure of trauma resuscitation teams, *Proc. Human Factors and Ergonomics Society 46th Ann. Mtg.*, 569-573
14. Mackenzie, C, **Xiao, Y**, Hu P, Seagull, FJ, Hammond, C, Bochicchio, G, Chu, W, O'Connor, J, Gerber-Smith, L, Dutton, R. Video clips as data source for safety performance. *Proc. Hum. Fac. Erg. Soc. 46th Ann. Mtg.*, 1414-1417, 2002
15. **Xiao, Y**, Moss, J Mackenzie, C.F, Seagull, FJ, & Faraj, S (2002). Transactive responsibility systems and high reliability teams: a tentative formulation. *Proc. Human Factors and Ergonomics Society 46th Ann. Mtg.*, 1428-1432
16. Seagull, J.F., Mackenzie, C.F., Bogner, M.S., Sidhu, A., Davis, R., & **Xiao, Y**. Combining Experts and Video Clips: Ergonomic Analysis for Safer Medical Instrument Trays. *Proc. Human Factors and Ergonomics Society 46th Ann. Mtg.*, 1516-1520, 2002
17. Moss, J. & **Xiao, Y**. A comparison of communications needs in two operating room suites. *Proc. the American Medical Informatics Association Ann. Symp.*, 543-547, 2002
18. Lu, Y., **Xiao, Y.**, Sears, A., & Jacko, J. An Observational and Interview Study on Personal Digital Assistant (PDA) Uses by Clinicians in Different Contexts. *Proc. Int. Conf. on Human Computer Interaction*, Vol. 3, 93-97, 2003
19. Sears, A., Lin, M., Jacko, J., **Xiao, Y.** (2003). When Computers Fade Pervasive Computing and Situationally-Induced Impairments and Disabilities., *Proc. Int. Conf. on Human Computer Interaction*, Vol. 2, 1298-1302.
20. **Xiao, Y**, Seagull, J.F., Faraj, S., & Mackenzie, C.F. Coordination Practices for Patient Safety: Knowledge, Cultural, and Supporting Artifact Requirements. *Proc. International Ergonomic Assoc.*, 2003.
21. Seagull, J.F., **Xiao, Y.**, & Plasters, C. Distributed Planning Over Time and People: Balancing Sampling Effort and Information Accuracy. *Proc. IEEE Int. Conf. on Systems, Man, and Cybernetics*, pp. 1772-1777, 2003.
22. **Xiao, Y**, Seagull, J.F., Hu, P., Mackenzie, C.F., & Gilbert, T.B. Distributed Monitoring and a Video-Based Toolset. *Proc. IEEE Int. Conf. on Systems, Man, and Cybernetics*, pp. 1778-1783, 2003.
23. **Xiao, Y**, Seagull, J.F., Hu, P., Mackenzie, C.F., de Visser, J., & Wieringa, P. Distributed Monitoring In a Dynamic Environment: Trade-Offs of Information Access and Privacy. *Proc. IEEE Int. Conf. on Systems, Man, and Cybernetics*, pp. 4141-4146, 2003.
24. **Xiao, Y**, Seagull, J.F., Nieves-Khouw, F., Barczak, N., & Perkins, S. Why are they not responding to our alarms? Another analysis of problems with alarms. *Proc. the Human Factors and Ergonomic Society 47th Ann. Mtg.*, pp. 386-390, 2003.
25. Mackenzie, C.F., **Xiao, Y.**, & The IPO Group. Observational analysis of video records of team performance. *Proc. the Human Factors and Ergonomic Society 47th Ann. Mtg.*, pp. 1493-1497, 2003.
26. Seagull, J.F., Plasters, C., **Xiao, Y.**, & Mackenzie, C.F. Collaborative management of complex coordination information systems: operating room schedule coordination. *Proc. the Human Factors and Ergonomic Society 47th Ann. Mtg.*, pp. 1521-1525, 2003.
27. **Xiao, Y**, Seagull, J.F., Mackenzie, C.F., Ziegert, J., & Klein, K.J., Team communication patterns as measures of team processes: exploring the effects of task urgency and shared team experience. *Proc Hum Fac Erg Soc 47th Ann. Mtg.*, pp. 1502-1506, 2003.
28. Entin, E., Lai, F., Mackenzie, C.F., **Xiao, Y.**, Seagull, F.J., Malone, D., & Neal, L. Scenario-based teamwork skills training for geographically distributed teams. *Proc. Human Factors and Ergonomic Society 47th Ann. Meeting*, pp. 1526-1530, 2003.
29. Lu, Y.C., Lee, J.K., **Xiao, Y.**, Sears, A., Jacko, J., & Charters, K. Why Don't Physicians Use their Personal Digital Assistants? *Proc. American Medical Informatics Assoc. Symp.*, Washington, DC, 405-409, 2003
30. Plasters, C. L., Seagull, F. J. & **Xiao, Y.** Coordination Challenges in Operating-Room Management: An In-Depth Field Study. *Proc. American Medical Informatics Assoc. Symp.*, Washington, DC, 524-528, 2003.
31. **Xiao, Y.**, Plasters, C.L., Seagull, F.J., & Moss, J.A. Cultural and Institutional Conditions for High Reliability Teams. *Proc. the IEEE Conference on Systems, Man, & Cybernetics. 2580-2585. 2004*
32. Seagull, F.J., Ward, R., Mill, J., Goodrich, C.R., & **Xiao, Y.** Measuring Awkwardness of Workplace Layout: Dispersion of Attentional and Psychomotor Resources Within the Anesthesia Workspace. *Proc Hum Fac Erg Soc Ann. Mtg.*, 1755-1758. 2004.
33. Kobayashi M, Fussell SR, Xiao Y, Seagull FJ. Work Coordination, Workflow, and Workarounds in a Medical Context. *Proc. CHI: Conf. on Human Factors in Computing*. pp. 1561-1564. 2005
34. Mackenzie CF, Hu FP, Fausball C, Nerlich M, Benner T, Gagliano D, Whitlock W, Lam D, **Xiao Y**. Challenges to Remote Emergency Decision-Making for Disaster or Homeland Security. *Proc Hum. Fac. & Erg. Soc. 49th Ann. Mtg.* 544-547. 2005
35. **Xiao Y**, Plasters C, Seagull FJ, Mackenzie CF. Negotiation and Coordination: A Preliminary Field of Conflict Management in Large Scale Collaboration. *Proc Hum. Fac. & Erg. Soc. 49th Ann. Mtg.* 539-543. 2005
36. Ho D, **Xiao Y**, Seagull FJ, Sisley A, Dutton R, Mackenzie CF. Handbooks or Mentors? The Role of a Resident Physician Manual in Resident Education. *Proc Hum. Fac. & Erg. Soc. 49th Ann. Mtg.* 1474-1477. 2005

C. Research Support. List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and responsibilities of principal investigator identified above.

Active

National Science Foundation ITR-01221570 (P.I.) 2002-2006

Universal access for situational induced impairments

The primary goal of this project is to model factors limiting the use of mobile computing devices through field studies and survey methodologies and to understand design features to counter the limiting factors in healthcare settings.

Army Research Institute Z856401 (P.I. at UM) 2003-2006

Leadership: Enhancing team adaptability in dynamic settings

The primary goal of this project is to determine predictors of individuals' and teams' abilities to perform adaptively and well in response to changing, unpredictable, dynamic work demands., such as trauma resuscitation and care management, using interviewing and observational methodologies.

National Science Foundation ITR-0325087 (P.I.) 2003-2008

Large scale collaboration in critical environments

The primary goal of this project is to develop a theory of coordination in multi-tasking, multi-thread complex organizations and to develop coordination support tools in large-scale collaboration and practical solutions to cross-team coordination.

National Science Foundation IIS-0534646 (P.I.) 2005-2008

Supporting rapid transfer of information and responsibility

The primary goal of this project is to understand essential issues related to rapid transfer of information and responsibilities in mission critical domains such as medical intensive care units, and to further our understanding of embedded technology as part of collaborative systems through field research and information technology experimentation.

National Aeronautics and Space Administration (Co-Investigator) 2005-2009

Multimedia enhanced emergency medical procedure checklist as a countermeasure to improve clinical capabilities on long-term space missions

The primary goal of this project is to develop design principles for performance enhancing systems through intuitive just-in-time multimedia guides (from line-drawn animation to high-resolution video) that can be used in vital, time-critical emergency medical procedures in space missions.

Recent

Nortel Network RAP-161565 (P.I.) 2000-2005

The mobile, digitally-connected doctor (MobiDoc) project

The primary goal of this project is to develop next generation wireless internet solutions using the concept of dynamic information transfer to extend the support workflow from field to hospital care.

Agency for Healthcare Research and Quality HS 11279-01 (Co-Investigator) 2001-2004

Brief risky high benefit procedures: Best practice models

The primary goal of this project is to develop best practices in high risk procedures through the use of video recording, analysis, and training.

Agency for Healthcare Research and Quality P20 HS11562-01 (P.I.) 2001-2005

Developmental center for education and research in patient safety

The primary goal of this project is to develop a network of researchers in clinical settings and to develop a training method to improve patient safety during the use of central venous catheters.