
BIOGRAPHICAL SKETCH

NAME Jay S. Bayne	POSITION TITLE Research Professor, Mathematics, Statistics and Computer Science
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
University of Santa Barbara	BS	1970	Electrical Engineering
University of Santa Barbara	MS	1971	Electrical Engineering & Computer Science
University of Santa Barbara	PhD	1976	Electrical Engineering & Computer Science

A. Personal Statement

I have over 30 years of academic and commercial experience, and expertise in distributed time-critical systems, cognitive computing (e.g., artificial intelligence, computer learning algorithms), service systems, command and control systems, cyberphysical systems, and cybernetics. Some of my notable work includes: Senior Consultant to the Office of the Assistant Secretary of Defense for Networks and Information Integration (I worked on policy and infrastructure for global Command and Control systems); CTO for two global industrial automation companies, each with annual revenues exceeding \$20B; expertise in modeling, simulation, visualization and analytics related to understanding the behavior of large-scale intelligent service systems and platforms for distributed, time-critical software-as-a-service (SaaS) applications. While serving as CTO at the above-noted engineering companies, I have extensive experience in the design, application, and management of high-assurance, real-time distributed control systems for automation in a wide range of continuous, batch and discrete industrial processes. This experience includes hiring, promotion and retention of senior research and development personnel in R&D laboratories located in European, North American and Asia-Pacific regions. In both academic and commercial settings, I have published extensively on the science and technology of interactive, distributed real-time systems, advanced control systems and systems science (cybernetics), including underlying hardware and software technologies and their application to the governance of safety-critical systems.

1. Bayne, J., "Cyberspatial Mechanics," IEEE Transactions on Systems, Man and Cybernetic—Part B, Vol. 38, No. 3, June 2008
2. Bayne, J., "High Assurance Service Systems," published as a chapter in a Springer textbook entitled High Assurance Service Systems, May 28, 2009
3. Bayne, J., "A Software Architecture for Control of Value Production in Federated Systems," World Multi-Conference on Systemics, Cybernetics & Informatics, Orlando, July 28th, and published in the Journal of Systemics, Cybernetics & Informatics, Vol. 1, No. 8, August 2003, Best Paper
4. Bayne, J., Creating Rational Organizations – Theory of Enterprise Command & Control, Lulu Press, June 2006

B. Positions and Honors

Positions and Employment

2019–present	IT/Development Instructor, Milwaukee Area Technical College
2016–present	Research Professor, Marquette University, Mathematics, Statistics & Computer Science
2016–present	Founder & Principal, Stratum 4 LLC

2007–2016	Co-Founder/Executive Director, Milwaukee Institute, Inc., Milwaukee, WI.
2006–present	Adjunct Professor, Computer Science, U of Wisconsin Milwaukee (UWM), Milwaukee, WI.
2005–2007	Sr. Consultant, Office Secretary of Defense/Networks & Information Integration (NII)
2003–2016	Founder/President, Meta Command Systems, Inc. (MCSI), Mequon, WI.
1998–2002	VP Technology, Johnson Controls, Inc (JCI), Milwaukee, WI.
1989–1998	VP Technology & Strategic Marketing, Asea Brown Boveri (ABB), Wickliffe, OH.
1984–1989	VP Technology, Combustion Engineering (CE, now ABB), Stamford, CT. 1976–1985
	Founder/President, Protocol Solutions, Inc (PSI), San Luis Obispo, CA.
1973–1984	Professor, Comp Science, California Polytechnic State University, San Luis Obispo, CA.

Other Experience and Professional Memberships

1974–present	Sr. Member IEEE: Institute of Electrical & Electronic Engineers 1975–
present	Professional Member ACM: Association for Computing Machinery 2009–
present	Advisory Board, NSF Funded Center for Autonomic Computing (CAC)
2008–present	Advisory Board, NSF Funded Programs on Cyberphysical Systems (CPS)
2008–present	Member Board of Directors, Wisconsin Technology Council

Honors

2009	Named “Distinguish Engineer” by ACM
2006	Best Paper Award CCRTS
2005	Best Paper Award CCRTS
2003	Best Paper Award JSCI
1998	Best Paper Award AIRTC

C. Contribution to Science

1. A core area of my scientific contributions is the theory, technology and engineering of enterprise command and control (EC2) systems. EC2 defines a computational model encompassing the structure, function and performance of enterprise governance in federated systems. The model provides for the simultaneous, unified and time-critical objectives of self-directed (unilateral) and group-directed (multilateral) decision and control. While such systems are typically used to provide accurate, complete, and timely information for the operational chain of command for force projection in the U.S. armed services (e.g., Joint Forces Command).
 - a. Bayne, J., Creating Rational Organizations – Theory of Enterprise Command & Control, Lulu Press, Second Edition, June 2012
 - b. Bayne, J. and Diggs, D., “Command and Control in the Joint Task Force Enterprise,” 11th Command and Control Research and Technology Symposium (CCRTS), San Diego, CA, June 2006, Best Paper
 - c. Bayne, J. and Paul, R., “Policy Based Command and Control,” 10th International Command and Control Research and Technology Symposium, June 2005
 - d. Bayne, J. and Paul, R., “Scale Free Command and Control,” 10th International Command and Control Research and Technology Symposium, June 2005, Best Paper
2. Artificial Intelligence, system adaptation and performance measurements are other important areas of my expertise that bear on the current project.
 - a. Bayne, J., “Cyberspatial Mechanics,” IEEE Transactions on Systems, Man and Cybernetic—Part B, Vol. 38, No. 3, June 2008
 - b. Bayne, J., Seem, J., Drees, K., “Adaptive Industrial Controls,” 7th International Symposium on Artificial Intelligence in Real-time Control (AIRTC’98), October 1998, winner “Best Paper Award”

- c. Bayne, J., "MetaSystems," Proceedings of the Instrumentation, Systems, and Automation (ISA) Society, 1998
 - d. Bayne, J., "Performance Measurement in C2 Systems," Proceedings of the 8th International Command and Control Research and Technology Symposium, National Defense University, Ft. McNair, Washington DC, June 2003
 - e. Bayne, J., "Scalability of Performance in High Volume Commercial Control Systems," Proc IEEE International Symposium of Object-Oriented Real-time Systems (ISORC), 1999
3. I am expert in ensuring the viability of dynamic, probabilistic, large-scale interactive systems. Systems are dynamic when their behaviors unfold in time as functions of their present states, present inputs, and generated outputs. Systems are probabilistic when, for example, measures of their inputs and outputs contain random errors (i.e., noise) or their internal states are uncertain due to statistical occurrence of failures. Systems are interactive when they are required to react to their environment's unpredictability and to adapt to an evolving context (for example, when encountering users demonstrating behaviors not understood by the system). And systems are viable when they survive in such evolving contexts. Viability is the primary requirement for high-availability interactive systems.
- a. Bayne, J., "Automation & Control in Grid-Connected Systems," 3rd IEEE Electro-Information Technology Conference, Indianapolis, IN, June 2003
 - b. Bayne, J., "Automation & Control in Large-scale Interactive Systems," Proc IEEE International Symposium on Object-Oriented Real-time Computer Systems (ISORC), 2002
 - c. Bayne, J., "Distributed Real-time Enterprise," 2002, available at www.metacomsys.com, submitted to the IEEE Transactions on Systems, Man and Cybernetics, 2005
 - d. Bayne, J., "Industrial Automation & Control in a Networked Economy," invited paper, IEEE Workshop on Object-oriented Real-time Distributed Systems (WORDS), Santa Barbara, CA, 1996

D. Research Support

Current Research Support

Pending.