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## BIOGRAPHICAL SKETCH

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NAME Verzi, Stephen Joseph	POSITION TITLE Senior Member of Technical Staff
eRA COMMONS USER NAME (credential, e.g., agency login) sjverzi	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
University of New Mexico	B.S.	12/87	Computer Science (Mathematics minor)
University of New Mexico	M.S.	05/90	Computer Science
University of New Mexico	Ph.D.	05/03	Computer Science

### A. Personal Statement

Dr. Stephen J Verzi is a technical lead on several projects at Sandia National Laboratories, including modeling population dynamics and software development for the Complex Adaptive Systems of Systems (CASoS) Engineering initiative, algorithm and software development for the Behavioral Influence Assessment project and computational modeling for the Emerging Brain Maps project. Dr. Verzi has degrees from the University of New Mexico (BS, MS and PhD, in Computer Science with dissertation focus on Modeling and Analysis of Artificial Neural Networks). He worked for many years in the fields of Software Engineering (including formal design and implementation), Text Processing and Analysis and Modeling and Simulation, where he has participated in and lead teams of software developers in coding systems such as a general-use modeling and simulation engine (Tempus) and computational modeling of light propagation through the atmosphere (WaveTrain) using the Tempus engine at MZA Associates Inc., text-based information retrieval in the Sandia Text Analysis Extensible Library (STANLEY), a document classification system using STANLEY for the Yucca Mountain Licensing Application project, and designing and implementing a computational model of human choice behavior using System Dynamics (SD) at Sandia National Laboratories. Dr. Verzi's current research includes improving and exploring the use the SD model of human behavior in modeling how individuals and groups of humans behave in complex situations involving social interactions as well as other exogenous input and exploring complex dynamic network operation at multiple scales from cellular (neural) interaction to networks of neural structures (each containing multiple neurons themselves) to social networks and the formation of coalitions (groups) in social networks to semantic concept networks and the representation and communication of information and ideas. This research involves bringing together a variety of fields including statistical machine learning and pattern recognition, modeling human choice behavior using qualitative choice theory and the theory of planned behavior, information theory and game theory, as well as neuroscience and neuropsychology.

Dr Verzi's experience in modeling human behavior and semantic analysis of text allows him to contribute to this research, and he is happy to be a part of this project.

### B. Positions and Honors

#### Positions and Employment

1998-2003	Senior Software Developer, MZA Associates Inc., Albuquerque, NM
2004-2010	Member of Technical Staff, Sandia National Laboratories, Albuquerque, NM
2010-	Senior Member of Technical Staff, Sandia National Laboratories, Albuquerque, NM

## Other Experience and Professional Memberships

Dr. Verzi currently has an Adjunct Professor appointment at the University of New Mexico in Albuquerque, New Mexico, where he has taught Pattern Recognition, Introduction to Information Theory and Software Design.

- *Member*, International Neural Network Society, 2003-2011
- *Reviewer*, Neural Networks Journal, 2010-2011
- *Reviewer*, Journal of Intelligent & Fuzzy Systems, 1990-1991

## Honors

- *Sandia Award for Excellence*, Sandia National Laboratories, Cognitive Science and Technology (CS&T) Program Startup Team, 2007 – CS&T becomes part of Science, Technology and Engineering New Directions Laboratory Directed Research and Development (LDRD) program
- *Sandia Award for Excellence*, Sandia National Laboratories STACY Yucca Mountain Project Team (YMP), 2008 – STACY team delivers key technologies to YMP licensing success
- *Sandia Spot Award for Excellence*, Sandia National Laboratories, 2008 – Excellence in creative technical work

**C. Selected Peer-reviewed Publications** (Selected from more than 30 journal articles or papers in conference proceedings)

### Most relevant to the current application

1. Moore, T.W., P.D. Finley, J.M. Linebarger, A.V. Outkin, S.J. Verzi, N.S. Brodsky, D. Cannon, and R.J. Glass, Extending Opinion Dynamics to Model Public Health Problems and the Evaluation of Policy Interventions, to appear *in Proceedings of International Conference on Complex Systems*, 2011.
2. Bier A., M.L. Bernard, G. Backus, M.R. Glickman, and S.J. Verzi. Using a Hybrid Cognitive-System Dynamics Model to Anticipate the Influence of Events and Actions on Human Behaviors, to appear *in Proceedings of 29<sup>th</sup> International Conference of the System Dynamics Society*, 2011.
3. Chew, P.A., B.W. Bader, S. Helmreich, A. Abdelali, and S.J. Verzi, An information-theoretic, vector-space-model approach to cross-language information retrieval, *Natural Language Engineering*, 5 Jan. 2011; Vol. 17, No. 1, p. 37-70.
4. Vineyard, C.M., M.L. Bernard, S.E. Taylor, T.P. Caudell, P. Watson, S.J. Verzi, N.J. Cohen, and H. Eichenbaum, A neurologically plausible artificial neural network computational architecture of episodic memory and recall, *in Proceedings of the First International Conference on Biologically Inspired Cognitive Architectures*, 2010; p. 175-180.
5. Speed, A., S.J. Verzi, J.S. Wagner, and C. Warrender, Optical holography as an analogue for a neural reuse mechanism, *Behavioral and Brain Sciences*, 2010; Vol. 33, No. 4, p. 291-292.
6. Verzi, S.J., G.L. Heileman, M. Georgiopoulos, and G. Anagnostopoulos, Universal Function Approximation with Fuzzy ART and Fuzzy ARTMAP, *in Proceedings of the International Joint Conference on Neural Networks*, 2003; Vol. 3, p. 1987-1992.

### Additional recent publications of importance to the field (in chronological order)

7. Vineyard, C.M., S.J. Verzi, M.L. Bernard, S.E. Taylor, W.L. Shanefeldt, I. Dubicka, J.T. McClain, and T.P. Caudell, A Neurophysiologically Inspired Hippocampus Based Associative-ART Artificial Neural Network Architecture, to appear *in Proceedings of International Joint Conference on Neural Networks*, 2011.
8. Djordjevich D.D., P.G. Xavier, M.L. Bernard, J.H. Whetzel, M.R. Glickman, and S.J. Verzi, Preparing for the Aftermath: Using Emotional Agents in Game-Based Training for Disaster Response, *in Proceedings of IEEE Symposium on Computational Intelligence and Games (CIG'08)*, 2008; p.266-275.
9. Verzi, S.J., G.L. Heileman, and M. Georiopoulos, Boosted ARTMAP: Modifications to fuzzy ARTMAP motivated by boosting theory, *Neural Networks*, May 2006; vol.19, no.4, p.446-468.

## **D. Research Support**

### Ongoing Research Support

### Completed Research Support