

## CURRICULUM VITAE

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U.S. Citizen

### Education

- PhD, Computer Science** - *University of Texas at Austin* (2003)  
Dissertation: Incremental Nonmonotonic Parsing through Semantic Self-Organization  
Advisor: Risto Miikkulainen
- MS, Computer Science** - *University of Texas at Austin* (1995)
- BS, Computer Science** - *University of Texas at Austin* (1993; Highest Honors)
- BS, Mathematics** - *University of Texas at Austin* (1993; Highest Honors)

### Honors

- Outstanding Teaching Assistant Award, 2002.
- Participant in Summer Institute in Japan program, 1998.
- Dean's Graduate Student in Computer Science Department, 1993.
- Dean's List, 1991-93.

### Research Experience

- Jun 03–Aug 08 *Saarland University, Saarbrücken, Germany*  
**Scientific Researcher** Neural network research on the *Adaptive Mechanisms for Human Language Processing* project led by Prof. Dr. Matthew Crocker as part of the SFB-378 program, *Resource-Adaptive Cognitive Processes*. Development of a connectionist model of the interaction of spoken language and visual scenes that exhibits five hallmark characteristics of cognitive behavior: incremental interpretation, anticipation of upcoming role fillers, and the integration, adaptation, and coordination of multimodal information sources as revealed by eye-tracking experiments.
- Dec 98–Aug 03 *University of Texas, Austin, TX*  
**PhD Candidate** Dissertation research under the supervision of Dr. Risto Miikkulainen using a neural network model to semantically parse VerbMobil sentences from the LinGO Redwoods Treebank into their Minimal Recursion Semantics dependency graphs, while retaining important cognitive characteristics such as incrementality, anticipation, and robustness.
- May 00–Aug 00/May 01–Aug 01 *Stanford Medical Informatics, Stanford University, Palo Alto, CA*  
**Research Consultant** Development of servlet code in Java to function as a web-interface with Protégé to the Pharmacogenetics Knowledge Base (PharmGKB) under development at the SMI laboratory. Research using statistical methods to populate PharmGKB with information from Medline, as well as coupling the PharmGKB Java code with the *Jess* Rule Engine Inferencing System.
- Jun 98–Aug 98 *Advanced Telecommunications Research Institute International, Kyoto, Japan*  
**Visiting Research Scientist** Applied connectionist techniques to the segmentation and POS-tagging of Japanese text as a member of the NSF/STA-sponsored Summer Institute in Japan program.

- May 95–Aug 95 *Nijmegen Institute for Cognition and Information*, Nijmegen, the Netherlands  
**Visiting Research Scientist** Assisted in the development of a hybrid connectionist-symbolic system which integrated handwriting-recognition technology with a Scheme parser to demonstrate the feasibility of using context to facilitate recognition.
- May 93–May 94 *University of Texas*, Austin, TX  
**Research Scientist Assistant** *Proved open ten-year-old conjecture* regarding the ground completeness of first-literal hyperresolution proposed by Dr. Woodrow Bledsoe in 1983. Further work on completeness of SETVAR, an extension of resolution able to handle many important theorems expressible in a subset of second-order predicate logic.

## Work Experience

- Mar 07–Apr 07 *Hewlett Research, Inc.*, Palo Alto, CA  
**Consultant** Clustered and classified video descriptions mined from sites such as YouTube using latent semantic indexing and multidimensional scaling for visualization.
- Nov 92–May 93 *TRP Consulting*, Austin, TX  
**Computer Systems Engineer** Design and implementation of various business applications in the Progress Database language.
- May 88–Jun 90 *Martin Marietta Data Systems*, San Antonio, TX.  
**Computer Systems Designer** Two years' experience on a large-scale advanced development project to design, develop, and maintain application programs in Model204, Fortran77, and COBOL on the IBM 4341 mainframe. Top Secret SCI+ clearance, last updated in November, 1987.
- Jul 82–Mar 88 *United States Air Force*, Kelly AFB, TX; Berlin, West Germany  
**Russian Linguist** Performed interpretation and analysis of all-source intelligence reports in support of foreign and domestic weapons systems. Top Secret SCI+ clearance.

## Publications

### • Journal Articles

1. Marshall R. Mayberry, III, Matthew W. Crocker, and Pia Knoeferle (in press). Learning to Attend: A Connectionist Model of Situated Language Comprehension. *Cognitive Science*.
2. Matthew W. Crocker, Pia Knoeferle, and Marshall R. Mayberry, III (submitted). Situated Sentence Processing: The Coordinated Interplay Account and a Neurobehavioral Model. *Brain and Language*.
3. Marshall R. Mayberry, III, and Risto Miikkulainen (2005). Broad-Coverage Parsing with Neural Networks. *Neural Processing Letters*; 21:121-132.

### • Conference Articles

4. Marshall R. Mayberry, III, Matthew W. Crocker and Pia Knoeferle (2006). A Connectionist Model of the Coordinated Interplay of Scene, Utterance, and World Knowledge. *Proceedings of the 28th Annual Conference of the Cognitive Science Society*, (CogSci-06, Vancouver, Canada), Mahwah, NJ: Erlbaum.
5. Marshall R. Mayberry, III, Matthew W. Crocker and Pia Knoeferle (2005). A Connectionist Model of Anticipation in Visual Worlds. *Proceedings of the 2nd International Joint Conference on Natural Language Processing*, (IJCNLP-05, Jeju, Korea).
6. Marshall R. Mayberry, III, Matthew W. Crocker and Pia Knoeferle (2005). A Connectionist Model of Sentence Comprehension in Visual Worlds. *Proceedings of the 27th Annual Conference of the Cognitive Science Society*, (CogSci-05, Stresa, Italy), Mahwah, NJ: Erlbaum.
7. Marshall R. Mayberry, III, and Risto Miikkulainen (2003). Incremental Nonmonotonic Parsing through Semantic Self-Organization. *Proceedings of the 25th Annual Conference of the Cognitive Science Society*, (CogSci-03, Boston, MA), Mahwah, NJ: Erlbaum.

8. Marshall R. Mayberry, III, and Risto Miikkulainen (1999). Using a Sequential SOM to Parse Long-term Dependencies. *Proceedings of the 21st Annual Conference of the Cognitive Science Society*, (CogSci-99, Vancouver, Canada), Mahwah, NJ: Erlbaum.
  9. Marshall R. Mayberry, III, and Risto Miikkulainen (1999). SARDSRN: A neural network shift-reduce parser. *Proceedings of the 16th International Joint Conference on Artificial Intelligence*, (IJCAI-99, Stockholm, Sweden), San Francisco: Kaufmann.
  10. Marshall R. Mayberry, III, and Risto Miikkulainen (1994). Lexical Disambiguation Based on Distributed Representations of Context Frequency. In *Proceedings of the 16th Annual Conference of the Cognitive Science Society*, (CogSci-94, Atlanta, GA), Hillsdale, NJ: Erlbaum.
- **Workshop and Symposium Articles**
    11. Marshall R. Mayberry, III, Matthew W. Crocker, and Pia Knoeferle (2007). Language, Scene & Attention: Towards a computational theory of situated comprehension. Presented with Matthew W. Crocker at: *Workshop on Embodied Sentence Processing: Behavioural, Neuropsychological, and Computational Perspectives*, Saarbrücken, Germany.
    12. Marshall R. Mayberry, III, Matthew W. Crocker and Pia Knoeferle (2005). A Connectionist Model of Language-Scene Interaction. *Proceedings of the ACL Workshop on Psychocomputational Models of Human Language Acquisition*, Ann Arbor, MI.
    13. Marshall R. Mayberry, III, and Matthew W. Crocker (2004). Generating Semantic Graphs through Self-Organization. *Proceedings of the AAI Symposium on Compositional Connectionism in Cognitive Science*, Washington, D.C.
  - **Book Chapters**
    14. Marshall R. Mayberry, III, and Risto Miikkulainen (2000). Combining Maps and Distributed Representations for Shift-Reduce Parsing. In Wermter S., Sun R. (eds), *Hybrid Neural Symbolic Systems*, Springer: Heidelberg, Germany.
    15. Risto Miikkulainen and Marshall R. Mayberry, III. (1999). Disambiguation and Grammar as Emergent Soft Constraints. In B. J. MacWhinney (editor), *Emergentist Approaches to Language*, Hillsdale, NJ: Erlbaum.
    16. Lambert Schomaker, Eduard Hoenkamp, and Marshall R. Mayberry, III. (1998). Towards collaborative agents for automatic on-line handwriting recognition. *Proceedings of the Third European Workshop on Handwriting Analysis and Recognition*, London: The Institution of Electrical Engineers, Digest Number 1998/440.
  - **Conference Abstracts**
    17. Marshall R. Mayberry, III, and Matthew W. Crocker (2007). An Attentional Model of Situated Language Understanding. Presented at: *The 13th Annual Conference on Architectures and Mechanisms for Language Processing*, Turku, Finland.
    18. Marshall R. Mayberry, III, Matthew W. Crocker, and Pia Knoeferle (2007). A connectionist model of sentence comprehension in context. Presented at: *The Second European Cognitive Science Conference*, Delphi, Greece.
    19. Marshall R. Mayberry, III, and Matthew W. Crocker (2005). A Model of Anticipation and Early Disambiguation in Visual Worlds. Presented at: *The 18th Annual CUNY Conference on Human Sentence Processing*, Tucson, AZ.
    20. Marshall R. Mayberry, III, and Matthew W. Crocker (2004). Incrementality and Anticipation in a Scaleable Network Model of Linguistic Competence and Performance. Presented at: *The 17th Annual CUNY Conference on Human Sentence Processing*, Washington, D.C.
  - **Technical Reports**
    21. Marshall R. Mayberry, III. (1997) On the Completeness of FLH-Resolution. Technical Report TR-97-26, Department of Computer Sciences, University of Texas at Austin.

## Invited Talks

- “Modelling Covert Attention in Situated Language Understanding”, Potsdam, Germany, November 2, 2007.
- “A Connectionist Model of Covert Attention in Situated Language Comprehension”, Freiburg, Germany, July 18, 2007.
- “Connectionist Models of Sentence Comprehension in Context”, EuroCogSci07, Delphi, Greece, May 25, 2007.
- “Incremental Nonmonotonic Self-Organization of Meaning”, Department of Theoretical Methods, Slovak Academy of Sciences, Bratislava, Slovakia, April 20th, 2006.
- “On-line Understanding in Visual Contexts: Eye-tracking Evidence and Computational Models”, Information Structure in Language Processing and Language Acquisition, Potsdam, Germany, October 1-2, 2004.
- “Shift-Reduce Parsing for Neural Networks”, Learning Computational Grammars (LCG) project of European Community’s Training and Mobility of Researchers programme meeting, Dublin, Ireland, November 15-16, 1999.

## Grants and Awards

- National Science Foundation Fellowship, 1994/1996/1998, \$45,000.
- Micro-Electronics and Computer Development Fellowship, 1993/1995, \$6000.
- Endowed Presidential Scholarship, 1992-93, \$1000.

## Professional Service

- Program Committee member for
  - *The Twenty-First International Conference on Machine Learning* (2004)
  - *The Twenty-Second Conference on Artificial Intelligence* (2007)
- Reviewer for
  - *Special Issue of the Journal of Machine Learning Research: Machine Learning Approaches to Shallow Parsing* (2001)
  - *Journal of Artificial Intelligence Research* (2002)
  - *Trends in Cognitive Sciences* (2002)
  - *Neural Networks Special Issue: New Developments in Self-Organizing Systems* (2004)
  - *The Twenty-Eighth Annual Conference of the Cognitive Science Society* (2006-2008)
  - *The Embodied Sentence Processing Workshop* (2007)
  - *Cognition* (2007)
- Member of the Association for Computing Machinery and the Cognitive Science Society.

## Teaching, Saarland University, 2003-2008

- *Computational Psycholinguistics*, with Matthew W. Crocker.
- *Mathematical Foundations III: Statistical Methods*, with Matthew W. Crocker.
- *Introduction to Psycholinguistics*, seminars on parsing strategies.
- *Introduction to Computational Linguistics*, seminars on neural networks.

## Software Packages

**Mir** Sentence Processing package for rapid prototyping of typical architectures used in NLP research such as the simple recurrent network and self-organizing map.

**SignalSim** The SignalSim Spiking Neuron package is a Tcl/Tk GUI built on top of an event-driven simulator of an interconnected network of spiking neurons.

## Skills

- **Computer Languages:** C, Tcl/Tk, Perl, Java, C++, LISP, Prolog, Assembly Language, SQL
- **Systems Administration:** Mac OS X, Linux, some MS Windows
- **Software:** MatLab, R, Mathematica, Emacs, L<sup>A</sup>T<sub>E</sub>X, Lens, sundry specialized tools
- **Natural Languages:** Spanish (19 years); German (7 years); Russian (4 years); Japanese (3 years)

**Personal:** Happily married for over 18 years; interests include the melody of living languages, beautiful mathematics, fascinating computers and gadgets, tournament chess, world-wide travelling, classical and folk guitar, and the never-ending endeavor to contribute to the well-being of society.