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# Nate Blaylock, Ph.D.

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<b>Florida Institute for Human and Machine Cognition</b>	
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**Research Areas**     *Hybrid statistical and symbolic approaches to:*  
**Multimodal dialog systems** (including dialog modeling, dialog management, and system architecture)  
**Natural language understanding** (including deep understanding for spoken dialog, geospatial language understanding, and information extraction in clinical domains)  
**Intention recognition** (including plan and goal recognition)

**Education**     *University of Rochester, Rochester, New York*  
**Ph.D., Computer Science** 2005  
    *Dissertation:* Towards Tractable Agent-based Dialogue  
    *Advisor:* Prof. James F. Allen  
**M.S., Computer Science** 2001

*Brigham Young University, Provo, Utah*  
**B.S., Computer Science** 1999  
**B.A., Linguistics** 1999

## Research Experience

Jan 2007 – present     *Florida Institute for Human Machine Cognition (IHMC)*  
**Research Scientist**

Major projects include:

*DARPA SENSE Seedling*—produced a demonstration system for the “web browser of the future” involving a natural language collaborative dialog system for task learning, including the learning of individualized ontological knowledge for users.

*DARPA CALO*—participated in the final two years of development of the PLOW dialog system for task learning. Ported PLOW to the KM ontology system and developed an algorithm for semantically matching task requests for learned procedures. I also managed the Year 5 tech transfer effort to the local Naval Hospital, which culminated in software tests with Navy Corpsmen on the actual Military Health Services database system.

*Geospatial Language Understanding*—uses combined deep and shallow NLP techniques (in TRIPS) to track people and objects over time from text or speech descriptions. As the lead investigator, I designed and executed the creation of an annotated GPS-tagged corpus of path descriptions as well as the path understanding system.

*Information Extraction on Clinical Texts*—recently-funded project to use TRIPS deep language understanding to extract information from varied clinical texts in a larger project for comparative effectiveness research for cancer treatment. Lead NLP investigator.

*ARL Project on Multiagent Plan Recognition*—extended my thesis work to recognize goals involving multi-agent teams. Lead investigator.

Feb 2006 –  
Jan 2007

***Cycorp, Inc.***  
**Research Scientist**

Managed two projects:

*ONR Level 2/3 Fusion Project*—application of hybrid plan recognition techniques to (level 2/3) data fusion, including the use of Cyc to generate artificial corpora of event scenarios (i.e., “plans”) to learn probabilities for prediction.

*DARPA Seedling Project on Bootstrapped Learning*—seedling effort to define an appropriate language of instructor/student interaction and knowledge transfer for bootstrapped learning. As lead investigator, I worked closely with the DARPA program manager in defining the program.

Mar 2004 –  
Jan 2006

***Saarland University (Saarbrücken, Germany), Department of Computational Linguistics***  
**Research Associate**

Worked on the EC-funded TALK Project, which focused on the development of more portable and adaptive dialog systems. Research on dialog models that allow flexible, domain-independent dialog management. Major contributions to (and management of) a joint implementation (with DFKI) of the SAMMIE in-car, MP3 dialog system. Helped design and run two Wizard of Oz dialog data collections. Also managed Saarland University’s overall role in the TALK project.

Jan 2000 –  
Mar 2004

***University of Rochester, Department of Computer Science***  
**Research Assistant**

Research on statistical goal recognition and dialog modeling for the TRIPS dialog system. PhD thesis presented a model of dialog based on collaborative problem-solving as well as statistical methods for hierarchical goal recognition.

Summer  
2002

***RIACS, NASA Ames Research Center***  
**Research Intern**

Research focused on extending traditional spoken dialog systems to handle

dialog with mixed-initiative agents capable of planning and execution. Worked with two disparate groups at NASA (dialog and planning/robotics) and developed techniques for dialog systems to interface to "off-the-shelf" planners and executives and tried it with NASA's IDEA executive system.

- Summer 2000;  
Summer 1999
- Microsoft Research***  
**Research-Intern**
- Developed language-independent algorithms to align semantic-level dependency structures for large bilingual corpora as part of a machine translation system. Also collected and processed multilingual corpora and word lists for training and developed human evaluation and regression tools for the machine translation system.
- Sept 1998 –  
April 1999
- Brigham Young University, Department of Linguistics***  
**Research Assistant**
- Member of the Analogical Modeling of Language (AML) research group. Developed a system that uses AML to predict Japanese transliteration of adopted English loanwords.
- Summer 1998
- Saarland University (Saarbrücken, Germany), Department of Computational Linguistics***  
**Research Assistant**
- Japanese lexicon team member for Verbmobil: a multi-university machine translation project in Germany. Developed software for maintenance of the Japanese lexicon.

### **Software Engineering Experience**

- Jan – Sept 1997
- Micro Automation Systems Enterprise, Inc.***  
**Software Engineer**
- Database consulting firm. Developed client-side applications for inventory and accounting databases using Delphi and Access.
- 1991-1994,  
1996
- Blaylock & Company***  
**Software Engineer**
- Accounting firm. Developed database management and accounting applications using Delphi, Visual Basic, FoxPro, and BASIC.

### **Executive Experience**

- Dec 2007 –  
present
- The Church of Jesus Christ of Latter-day Saints***  
**Bishop of the Pace Congregation, Pace, Florida**
- (Unpaid) role similar to a pastor or parish priest. As bishop, I am the spiritual leader and executive of a congregation of over 300 members living in the Pace, Florida area. Relevant responsibilities include direction of church worship and activities, management of church finances, and the oversight of leaders of subordinate organizations (e.g., Sunday school, men and women's groups, youth groups, etc.)

## Software Engineering Skills

Over **16 years** industrial and research programming experience.

*High Proficiency:* Java, Perl, C++, Lisp, Delphi, Windows, Mac, Linux

*Moderate Proficiency:* OWL/RDF, XML/XSLT, Prolog, Objective C (iPhone), Matlab, Visual Basic, Microsoft Access, FoxPro, SQL, shell and batch scripts

## Language Skills

**English** *Native Speaker.*

**Japanese** *Fluent.* Lived in Japan for two years. Spoke Japanese every day.

**German** *Fluent.* Lived in Germany for two years. Speak at home.

**Spanish** *Fluent.* Speak at home. Over 14 years self-study.

**French** *Fair reading ability.* 1 college semester with intensive self-study.

**Chinese** *Basic Knowledge.* 1 college semester with intensive self-study.

## Teaching Experience

*Saarland University:* Winter 2004.

Co-taught graduate-level seminar on *Modeling Grounding Subdialogues in an ISU-based System* with Ivana Kruijff-Korbayová. Students read and presented papers as well as created small dialog systems based on rapid-development software I developed for the course.

*English as a Second Language:* 1994-1996, Tokyo, Japan

Taught biweekly English conversation classes for youth and adults as a community service. Taught English conversation, pronunciation, grammar, etc. based on own teaching plan and lessons. Also managed other volunteer teachers.

*Church instructor:* various

Over 7 years of cumulative experience in formal classroom religious instruction to adults and youth in sundry church positions.

## Honors and Awards

*Pensacola Independent News Rising Star Award:* 2009

Each year, the newspaper gives this award to a group of individuals under age 35 who are seen as upcoming leaders in their professions and the community.

## External Service

*Reviewer:* IJCAI Workshop on Plan, Activity, and Intent Recognition (PAIR), Pasadena, California, July 2009.

*Program Committee:* SIGdial Workshop on Discourse and Dialogue, Columbus, Ohio, June 2008.

*Program Committee:* International Conference on Intelligent User Interfaces (IUI) Canary Islands, January 2008.

*Reviewer:* AAAI Workshop on Plan, Activity, and Intent Recognition (PAIR), Vancouver, Canada, July 2007.

*Reviewer:* International Joint Conferences on Artificial Intelligence (IJCAI) Hyderabad, India, January 2007.

*Program Committee:* AAAI Workshop on Modeling Others from Observation, Boston, July 2006.

*Program Committee:* KONVENS Workshop: Advanced Topics in Modeling Natural Language Dialog. Vienna, September 2004.

*Reviewer:* European Summer School in Logic, Language, and Information (ESSLI) student session. Edinburgh, June 2002.

## Departmental Service

*Extended Systems Group Member:* 2004–2005.

Helped direct the departmental systems group. Included issues such as hardware/software acquisitions and setting computing policies.

*Curriculum Committee Member:* 2002–2003.

Helped develop curriculum for a new professional Masters degree to be offered by the department, as well as requirements for the new “research honors” distinction for undergraduate degrees.

*"Big Picture" Colloquium Director:* 2002–2003.

Coordinated weekly colloquium series for the University of Rochester symbolic artificial intelligence community. Duties included inviting and coordinating speakers, directing meetings, and so forth.

## Publications

### *Refereed Journal Papers and Book Chapters*

Hyuckchul Jung, James Allen, William de Beaumont, **Nate Blaylock**, George Ferguson, Lucian Galescu, Mary Swift. Going Beyond PBD: A Play-by-Play and Mixed-initiative Approach, *No Code Required: Giving Users Tools to Transform the Web*, edited by Allen Cypher, Mira Dontcheva, Tessa Lau, Jeffrey Nichols, Morgan Kaufmann Publishers, 2010. To appear.

James Allen, George Ferguson, **Nate Blaylock**, Donna Byron, Nate Chambers, Myroslava Dzikovska, Lucian Galescu, and Mary Swift. Chester: A personal medical advisor. *Journal of Biomedical Informatics*, 39(5):500-513, 2006.

**Nate Blaylock**, James Allen, and George Ferguson. Managing communicative intentions with collaborative problem solving. *Current and New Directions in Discourse and Dialogue*. Kluwer. 2003.

### *Refereed Conference and Workshop Papers*

**Nate Blaylock**, Bradley Swain, and James Allen. Mining Geospatial Path Data from Natural Language Descriptions In *Proceedings of the 1st ACM SIGSPATIAL GIS International Workshop on Querying and Mining Uncertain Spatio-Temporal Data*, Seattle, Washington. November 3, 2009.

**Nate Blaylock**, Bradley Swain, and James Allen. TESLA: A Tool for Annotating Geospatial Language Corpora. In *North American Chapter of the Association for Computational Linguistics - Human Language Technologies (NAACL HLT)*. Boulder, Colorado, May 2009.

- Brandyn White, **Nate Blaylock**, and Ladislau Bölöni, Analyzing Team Actions with Cascading HMM, *Proceedings of the 22nd International FLAIRS Conference*, Sanibel Island, Florida, May 2009.
- Nate Blaylock** and James Allen. Real-time Path Descriptions Grounded with GPS Tracks: a preliminary report. In *Proceedings of the LREC Workshop on Methodologies and Resources for Processing Spatial Language*, Marrakech, Morocco. May 31 2008.
- Nate Blaylock**. Towards flexible, domain-independent dialogue management using collaborative problem solving. In *Proceedings of the Workshop on the Semantics and Pragmatics of Dialogue (DECALOG 2007)*, Rovereto, Italy. May 30-June 1 2007.
- Tilman Becker, **Nate Blaylock**, Ciprian Gerstenberger, Ivana Kruijff-Korbayová, Andreas Korthauer, Manfred Pinkal, Michael Pitz, Peter Poller, and Jan Schehl. Natural and intuitive multimodal dialogue for in-car applications: The SAMMIE system. In *Proceedings of the ECAI Sub-Conference on Prestigious Applications of Intelligent Systems (PAIS 2006)*, Riva del Garda, Italy, August 28–September 4, 2006.
- Nate Blaylock** and James Allen. Fast hierarchical goal schema recognition. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence (AAAI-06)*, Boston, Massachusetts, July 2006.
- Nate Blaylock** and James Allen. Hierarchical instantiated goal recognition. In *AAAI Workshop on Modeling Others from Observation (MOO-2006)*. Boston, Massachusetts, July 2006.
- Ivana Kruijff-Korbayová, Tilman Becker, **Nate Blaylock**, Ciprian Gerstenberger, Michael Kaißer, Peter Poller, Verena Rieser, and Jan Schehl. The SAMMIE corpus of multimodal dialogues with an MP3 player. In *5<sup>th</sup> International Conference on Language Resources and Evaluation (LREC 2006)*, Genoa, Italy, May, 2006.
- Nate Blaylock** and James Allen. A collaborative problem-solving model of dialogue. In *Proceedings of the 6<sup>th</sup> SIGdial Workshop on Discourse and Dialogue*, pages 200–211, Lisbon, September 2–3 2005.
- Nate Blaylock** and James Allen. Generating artificial corpora for plan recognition. In *User Modeling 2005*, number 3538 in Lecture Notes in Artificial Intelligence, pages 179–188. 2005. Springer.
- Ivana Kruijff-Korbayová, **Nate Blaylock**, Ciprian Gerstenberger, Verena Rieser, Tilman Becker, Michael Kaißer, Peter Poller, and Jan Schehl. An experiment setup for collecting data for adaptive output planning in a multimodal dialogue system. In *Proceedings of the 10th European Workshop on Natural Language Generation (ENLG-05)*, pages 191–196, Aberdeen, Scotland, August 2005.
- Nate Blaylock** and James Allen. Recognizing instantiated goals using statistical methods. In *Workshop on Modeling Others from Observations (MOO-2005)*, pages 79–86, Edinburgh, July 30 2005.
- Nate Blaylock** and James Allen. Statistical goal parameter recognition. In *Proceedings of the 14th International Conference on Automated Planning & Scheduling (ICAPS'04)*, Whistler, Canada, June 3–7 2004.
- Nate Blaylock** and James Allen. Corpus-based, statistical goal recognition. In

- Proceedings of the Eighteenth International Joint Conference on Artificial Intelligence (IJCAI'03)*, pages 1303–1308, Acapulco, Mexico, August 2003.
- Nate Blaylock**, John Dowding, and James Allen. A dialogue model for interaction with planners, schedulers and executives. In *Proceedings of the 3rd International NASA Workshop on Planning and Scheduling for Space*, Houston, Texas, October 27–29 2002.
- James Allen, **Nate Blaylock**, and George Ferguson. A problem-solving model for collaborative agents. In *First International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS'02)*, July 2002.
- Nate Blaylock**, James Allen, and George Ferguson. Synchronization in an asynchronous agent-based architecture for dialogue systems. In *Proceedings of the 3<sup>rd</sup> SIGdial Workshop on Discourse and Dialog*, Philadelphia, July 2002.

### **PhD Thesis**

- Nathan J. Blaylock**. *Towards tractable agent-based dialogue*. PhD thesis, University of Rochester, Department of Computer Science, August 2005.

### **Technical Reports and Project Deliverables**

- Tilman Becker, **Nate Blaylock**, Ciprian Gerstenberger, Andreas Korthauer, Nadine Perera, Michael Pitz, Peter Poller, Jan Schehl, Frank Steffens, Rosmary Stegmann, and Jochen Steigner. In-car showcase based on TALK libraries. Deliverable 5.3, TALK Project, January 2007.
- Andreas Korthauer, Ivana Kruijff-Korbayová, Tilman Becker, **Nate Blaylock**, Ciprian Gerstenberger, Michael Kaißer, Peter Poller, Verena Rieser, Jan Schehl, Oliver Lemon, Kallirroi Georgila, James Henderson, Pilar Manchón, and Carmen Del Solar. Final report on multimodal experiments - Part II: Experiments for data collection and technology evaluation. Deliverable 6.4 Part II, TALK Project, December 2006.
- David Milward, Gabriel Amores, **Nate Blaylock**, Staffan Larsson, Peter Ljunglöf, Pilar Manchón, and Guillermo Pérez. *Dynamic multimodal interface reconfiguration*. Deliverable 2.2, TALK Project, August 2006.
- Ivana Kruijff-Korbayová, Gabriel Amores, **Nate Blaylock**, Stina Ericsson, Guillermo Pérez, Kallirroi Georgila, Michael Kaisser, Staffan Larsson, Oliver Lemon, Pilar Manchón, and Jan Schehl. *Extended information state modeling*. Deliverable 3.1, TALK Project, February 2006.
- Nate Blaylock**, Bettina Fromkorth, Ciprian Gerstenberger, Ivana Kruijff-Korbayová, Oliver Lemon, Pilar Manchón, Anja Moos, Verena Rieser, Carmen del Solar, and Karl Weilhammer. *Annotators handbook*. Deliverable 6.2, TALK Project, February 2006.
- David Milward, Gabriel Amores, Tilman Becker, **Nate Blaylock**, Malte Gabsdil, Staffan Larsson, Oliver Lemon, Pilar Manchón, Guillermo Pérez, and Jan Schehl. *Integration of ontological knowledge with the ISU approach*. Deliverable 2.1, TALK Project, September 2005.
- Tilman Becker, **Nate Blaylock**, Ciprian Gerstenberger, Michael Pitz, Peter Poller, and Jan Schehl. *Baseline system for in-car showcase*. Deliverable 5.2, TALK Project, September 2005.

- Tilman Becker, Peter Poller, Staffan Larsson, Björn Bringert, Håkan Burden, Carine Cassia, Ann-Charlotte Forslund, David Hjelm, Rebecca Jonsson, Andreas Wallentin, Anna Wählby, Oliver Lemon, Kallirroi Georgila, Guillermo Pérez, **Nate Blaylock**, and David Milward. *Infrastructure*. Deliverable 5.1, TALK Project, February 2005.
- Tilman Becker, Oliver Lemon, Steve Young, **Nate Blaylock**, Ivana Kruijff-Korbayová, Kallirroi Georgila, and James Henderson. *Proposed methods for multimodal experiments*. Deliverable 6.1, TALK Project, November 2004.
- G. Ferguson, J. Allen, **N. Blaylock**, D. Byron, N. Chambers, M. Dzikovska, L. Galescu, X. Shen, R. Swier, and M. Swift. The Medication Advisor project: Preliminary report. Technical Report 776, University of Rochester, Department of Computer Science, May 2002
- Nate Blaylock**. Managing communicative intentions in dialogue using a collaborative problem-solving model. Technical Report 774, University of Rochester, Department of Computer Science, April 2002.
- Nate Blaylock**. Retroactive recognition of interleaved plans for natural language dialogue. Technical Report 761, University of Rochester, Department of Computer Science. December 2001.

#### **Other Publications**

- Tilman Becker, Peter Poller, Jan Schehl, **Nate Blaylock**, Ciprian Gerstenberger, and Ivana Kruijff-Korbayová. The SAMMIE system: multimodal in-car dialogue. In *Proceedings of COLING/ACL 2006*. Sydney, July 2006. Interactive Presentation.
- Ivana Kruijff-Korbayová, **Nate Blaylock**, Ciprian Gerstenberger, Verena Rieser, Tilman Becker, Michael Kaißer, Peter Poller, and Jan Schehl. Presentation strategies for flexible multimodal interaction with a music player. In *Proceedings of the Ninth Workshop on the Semantics and Pragmatics of Dialogue (D'IALOR 2005)*, Nancy, France, June 2005. Project Note.
- G. Aist, J. Dowding, B. A. Hockey, M. Rayner, J. Hieronymus, D. Bohus, B. Boven, **N. Blaylock**, E. Campana, S. Early, G. Gorrell, and S. Phan. Talking through procedures: An intelligent Space Station procedure assistant. In *Proceedings of EACL'03*, Budapest, Hungary, April 12–17 2003. Demo Note.
- Nate Blaylock**. Analogical modeling of Japanese loanword formation from English. *Brigham Young University Journal of Undergraduate Research and Creative Activities*, 1998–1999:17–18, 1999.
- Nathan Blaylock**. Verb-particle semantic compositions via diagrammar. In *Proceedings of the Deseret Language and Linguistics Symposium*, Provo, Utah, February 18–19 1999.

**References available upon request.**