

## Robert St. Amant

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### RESEARCH AREAS:

HCI—cognitive models of users, usability evaluation, intelligent user interfaces, interface agents; AI—practical planning, cognitive robotics, intelligent data analysis.

### EDUCATION:

1991-1996 Ph.D., Computer Science, University of Massachusetts, Amherst, MA  
1981-1985 B.S., EECS, The Johns Hopkins University, Baltimore, MD

### QUALIFICATIONS:

Steering Committee, *International Conference on Intelligent User Interfaces*.  
Associate Editor, *AI Magazine*.  
ACM SIGART Vice-Chair (2006-7) and Treasurer (2005-6).  
Notes co-chair, *ACM Conference on Human Factors in Computing Systems* (2007).  
Conference chair, *International Conference on Intelligent User Interfaces* (2005).  
Past program committee member, AAI, CHI, IUI, UIST, CADUI.

### AWARDS:

Best Paper (as co-author), *First International Symposium on Empirical Software Engineering and Measurement (ESEM, 2007)*, Madrid, Spain.  
Best Applied Paper (as first author), *Sixth International Conference on Cognitive Modeling (ICCM, 2004)*, Pittsburgh.  
Outstanding New Teacher, Department of Computer Science (1999); nominated College of Engineering Outstanding Teacher (2000, 2001).  
Recognition of Special Service, Heeresamt, German Army, Cologne (1991).

### EMPLOYMENT:

1996- Associate Professor (granted early tenure, 2001), Department of Computer Science, North Carolina State University  
Established a research lab (currently five Ph.D. and several M.S. students) with \$3.5M in funding from DARPA, NSF, and industry since 1997. Current and past projects: tool-using robots; cognitive models of mobile device usage; cognitive user interface agents; multi-touch interaction; mixed-initiative interaction; intelligent visualization; intelligent environments for interactive data analysis. Developed and taught courses in HCI, AI, and AI programming.

2004-2005 Visiting Research Scholar, Information Sciences Institute, University of Southern California  
Developed representations based on metaphor and image schemas, for dynamic problem-solving environments.

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1985-1991     *Software Engineer, Texas Instruments, Inc., and Texas Instruments Deutschland, GmbH*  
Member of technical team building AI applications for German defense market: logistical planning support and diagnostic expert systems.

### PUBLICATIONS:

#### Proceedings:

Begole, B., Payne, S., Churchill, E., St. Amant, R., Gilmore, D., and Rosson, M. B., editors.  
*Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*. ACM Press, New York, NY.

#### Journal and periodical articles:

- St. Amant, R., and Horton, T. E. Revisiting the definition of tool use. *Animal Behaviour*, in press.
- Healey, C. G., Kocherlakota, S., Rao, V., Mehta, R., and St. Amant, R. Visual perception and mixed-initiative interaction for assisted visualization design. *IEEE Transactions on Visualization and Computer Graphics*, in press.
- St. Amant, R., Horton, T. E., and Ritter, F. E. (2007). Model-based evaluation of expert cell phone menu interaction. *ACM Transactions on Human-Computer Interaction* 14(1): 1-24.
- Ritter, F. E., Van Rooy, D., St. Amant, R., and Simpson, K. (2006). Providing user models with direct access to computer interfaces: An exploratory study of a simple human-robot interface. *IEEE Transactions on Systems, Man, and Cybernetics* 36(3): 592-601.
- St. Amant, R., Freed A., and Ritter, F. E. (2004). Specifying ACT-R models of user interaction with a GOMS language. *Cognitive Systems Research* 6(1): 71-88.
- St. Amant, R. (2004). Environment modification in simulated navigation tasks for human-robot interaction. (Invited). *International Journal of Computational Cognition* 3(3): 65-73.
- St. Amant, R., and Young, R. M. (2001). Interface agents in model world environments. *AI Magazine* 22(4): 95-107. Winter.
- St. Amant, R., and Riedl, M. O. (2001). A perception/action substrate for cognitive modeling in HCI. *International Journal of Human-Computer Studies* 55(1): 15-39.
- St. Amant, R. (2000). Interface agents as surrogate users. *Intelligence magazine* 11(2): 29-38. Summer.
- St. Amant, R., Lieberman, H., Potter, R., and Zettlemyer, L. S. (2000). Visual generalization in programming by example. *Communications of the ACM* 43(3): 107-114. March.
- St. Amant, R. (1999). User interface affordances in a planning representation. *Human-Computer Interaction* 14(3): 317-354.
- St. Amant, R., Long, T. E., and Dulberg, M. S. (1998). Experimental evaluation of intelligent assistance for navigation. *Knowledge-Based Systems* 11(1): 61-70.
- St. Amant, R., and Cohen, P. R. (1998). Intelligent support for exploratory data analysis. *Journal of Computational and Graphical Statistics* 7(4): 545-558.
- St. Amant, R., and Cohen, P. R. (1998). Interaction with a mixed-initiative system for

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exploratory data analysis. *Knowledge-Based Systems* 10(5): 265-273.

St. Amant, R., Kuwata Y., and Cohen, P. R. (1996). Monitoring progress with dynamic programming envelopes. *International Journal of Artificial Intelligence Tools* 5(1-2): 143-153.

### Conference and workshop papers:

- Chang, Y.-H., Cohen, P. R., Morrison, C., and St. Amant, R. (2006). Piagetian Adaptation Meets Image Schemas: The Jean System. *From Animals to Animats 9: Proceedings of the Ninth International Conference on Simulation of Adaptive Behaviour*, Nolfi S., Baldassarre G., Calabretta R., Hallam J., Marocco D., Meyer J-A, Parisi D., eds. Lecture Notes on Artificial Intelligence, Volume 4095. Berlin, Germany: Springer Verlag, pp. 359-370.
- St. Amant, R., McBride, S. P., and Ritter, F. E. (2006). AI support for building cognitive models. *Proceedings of the Twenty-First National Conference on Artificial Intelligence (AAAI, Nectar track)*, pp. 1663-1666.
- St. Amant, R., Morrison, C. T., Chang Y.-H., Cohen, P. R., and Beal, C. (2006). An image schema language. *Proceedings of the Seventh International Conference on Cognitive Modeling*, pp. 292-297.
- Ritter, F. E., Haynes, S. R., Cohen, M., Howes, A., John, B., Best, B., Lebiere, C., Jones, R. M., Crossman, J., Lewis, R. L., St. Amant, R., McBride, S. P., Urbas, L., Leuchter, S., Vera, A. (2006). High-level Behavior Representation Languages Revisited. *Proceedings of the Seventh International Conference on Cognitive Modeling*, pp. 404-407.
- St. Amant, R., and Wood, A. B. (2005). Tool use for autonomous agents. *Proceedings of the National Conference on Artificial Intelligence (AAAI)*, pp. 184-189.
- St. Amant, R., and Ritter, F. E. (2004). Automated GOMS to ACT-R model translation. *Proceedings of the Sixth International Conference on Cognitive Modeling (ICCM)*, pp. 26-31.
- St. Amant, R., Horton, T. E., and Ritter, F. E. (2004). Model-based evaluation of cell phone menu interaction. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*, pp. 343-350.
- Green, N., Kruger, J., Faldu, C., and St. Amant, R. (2004). A reduced QWERTY keyboard for mobile text entry. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI), short papers*, pp. 1429-1432.
- Butler, C. G., and St. Amant, R. (2004). HabilisDraw DT: A bimanual tool-based direct manipulation drawing environment. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI), short papers*, pp. 1301-1304.
- Riedl, M. O., and St. Amant, R. (2003). Social Navigation: Modeling, simulation, and experimentation. *Proceedings of the International Joint Conference on Autonomous Agents and MultiAgent Systems (AAMAS)*, pp. 361-368.
- St. Amant, R., and Christian, D. B. (2003). Environment modification in a simulated human-robot interaction task: Experimentation and analysis. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 174-181.
- St. Amant, R., Dinardo, M. D., and Buckner, N. (2003). Balancing efficiency and interpretability in an interactive statistical assistant. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 181-188.
- Simpson, C. A., and St. Amant, R. (2003). Search for efficient device-dependent

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- action sequences in the user interface. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 297-299.
- Daughtry, J. M., and St. Amant, R. (2003). Power Tools and Composite Tools: Integrating Automation into Direct Manipulation Interfaces. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 233-235.
- Shah, K., Rajyaguru, S., St. Amant, R., and Ritter, F. E. (2003). Connecting a cognitive model to dynamic gaming environments: Architectural and image processing issues. *Proceedings of the Fifth International Conference on Cognitive Modeling (ICCM)*, pp. 189-194.
- Riedl, M. O., and St. Amant, R. (2002). Toward automated exploration of interactive systems. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 135-142.
- St. Amant, R., and Horton, T. E. (2002). A tool-based interactive drawing environment. *ACM Conference on Human Factors in Computing Systems (CHI) Extended Abstracts*, pp. 762-763.
- St. Amant, R., and Dudani, A. (2002). An environment for programming user interface softbots. *Proceedings of the International Working Conference on Advanced Visual Interfaces (AVI)*, pp. 119-122.
- St. Amant, R., Blair, J. E., Barry, P. A., Bentor Y., and Healey, C. G. (2002). A visual interface to a music database. *Proceedings of the International Working Conference on Advanced Visual Interfaces (AVI)*, pp. 85-88.
- Ritter, F. E., Van Rooy, D., and St. Amant, R. (2002). A user modeling design tool for comparing interfaces. *Proceedings of the Fourth International Conference on Computer-Aided Design of User Interfaces (CADUI)*.
- St. Amant, R., and Horton, T. E. (2002). Characterizing tool use in an interactive drawing environment. *Second International Symposium on Smart Graphics*, pp. 86-93.
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- St. Amant, R., Healey, C. G., Riedl, M. O., Kocherlakota, S., Pegram, D. A., and Torhola, M. (2001). Intelligent visualization in a planning simulation. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 153-160.
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- Dulberg, M. S., St. Amant, R., and Zettlemoyer, L. S. (1999). An imprecise mouse gesture for the fast activation of controls. *Proceedings of INTERACT*, pp. 375-382.
- Zettlemoyer, L. S., and St. Amant, R. (1999). A visual medium for programmatic control of interactive applications. *Proceedings of the ACM Conference on Human Factors in Computing (CHI)*, pp. 199-206.
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- St. Amant, R., and Dulberg, M. S. (1998). An experiment with navigation and intelligent assistance. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 171-178.
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- St. Amant, R., and Cohen, P. R. (1997). Interaction with a mixed-initiative system for exploratory data analysis. *Proceedings of the International Conference on Intelligent User Interfaces (IUI)*, pp. 15-22.
- St. Amant, R., and Cohen, P. R. (1997). Building an EDA assistant: a progress report. *Proceedings of the International Workshop on Artificial Intelligence and Statistics (AI & Stats)*, pp. 501-512.
- St. Amant, R. (1997). Navigation for data analysis systems. *Advances in Intelligent Data Analysis: Reasoning about Data*. Springer, pp. 101-110.
- St. Amant, R., and Cohen, P. R. (1996). A planner for exploratory data analysis. *Proceedings of the International Conference on Artificial Intelligence Planning Systems (AIPS)*. AAAI Press, pp. 205-212. Reprinted in *Readings in Agents*. Huhns, M., and Singh, M., eds. Morgan Kaufmann, pp. 131-138.
- St. Amant, R., and Cohen, P. R. (1995). Preliminary system design for an EDA assistant. *Proceedings of AI & Stats*, pp. 502-511.
- Cohen, P. R., Gregory, D. E., Ballesteros, L. A., and St. Amant, R. (1995). Two algorithms for inducing structural equation models from data. *Proceedings of AI & Stats*, pp. 129-139.
- St. Amant, R., and Cohen, P. R. (1995). A case study in planning for exploratory data analysis. *Advances in Intelligent Data Analysis*, pp. 1-5.
- St. Amant, R., Yoshitaka Kuwata, and Cohen, P. R. (1995). Monitoring progress with dynamic programming envelopes. *Seventh IEEE International Conference on Tools with AI*, pp. 426-433.
- St. Amant, R., and Cohen, P. R. (1994). Toward the integration of exploration and modeling in a planning framework. *Knowledge Discovery in Databases Workshop*, AAAI, pp. 49-50.
- St. Amant, R., and Cohen, P. R. (1994). A planning representation for automated exploratory data analysis. D. H. Fisher and Wray Buntine, editors, *Knowledge-Based Artificial Intelligence Systems in Aerospace and Industry*. Proc SPIE 2244, pp. 44-52.
- St. Amant, R., and Cohen, P. R. (1994). Automated analysis of complex data. *Ninth Annual Goddard Conference on Space Applications of Artificial Intelligence*, NASA Conference Publication 3268, pp. 161-172.
- Howe, A. E., St. Amant, R., and Cohen, P. R. (1994). Integrating statistical methods for characterizing causal influences on planner behavior over time. *Sixth IEEE International Conference on Tools with AI*.
- Cohen, P. R., Ballesteros, L. A., Carlson, A., and St. Amant, R. (1993). Automating path analysis for building causal models from data. *Proceedings of the International Conference on Machine Learning (ICML)*, pp. 57-64.
- Cohen, P. R., Ballesteros, L., Carlson, A., and St. Amant, R. (1993). Automating path

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analysis for building causal models from data: First results and open problems. *Knowledge Discovery in Databases Workshop*, AAAI, pp. 153-161.

Cohen, P. R., St. Amant, R., and Hart, D. M. (1992). Early warnings of plan failure, false positives and envelopes: Experiments and a model. *Proceedings of the Fourteenth Annual Conference of the Cognitive Science Society*, pp. 773-778.

### Book chapters:

St. Amant, R. (2005). [Artificial Intelligence](#). *The Encyclopedia of Human-Computer Interaction*, Bainbridge, W., ed. Berkshire Publishing.

St. Amant, R. (2005). Statistical Analysis Support. *The Encyclopedia of Human-Computer Interaction*, Bainbridge, W., ed. Berkshire Publishing.

St. Amant, R., Lieberman, H., Potter, R., and Zettlemoyer, L. S. (2001). Visual generalization in programming by example. *Your Wish Is My Command*, Lieberman, H., ed. Morgan Kaufmann.

St. Amant, R., and Cohen, P. R. (1997). Massive datasets and artificial intelligence planning. *Massive Data Sets Workshop*, Committee on Applied and Theoretical Statistics, National Research Council.

Cohen, P. R., Oates, T., and St. Amant, R. (1996). Plan steering and mixed-initiative planning. *Advanced Planning Technology: Technological Achievements of the ARPA/Rome Laboratory Planning Initiative*. Tate, A., ed. AAAI Press, pp. 105-112.

St. Amant, R., and Cohen, P. R. (1996). Control representation in an EDA assistant. *Learning from Data: AI and Statistics V*, Fisher, D. H., and Lenz, H., eds. Springer, pp. 353-362.

Cohen, P. R., Gregory, D. E., Ballesteros, L. A., and St. Amant, R. (1996). Two algorithms for inducing structural equation models from data. *Learning from Data: AI and Statistics V*, Fisher, D. H., and Lenz, H., eds. Springer, pp. 3-12.

Cohen, P. R., Hart, D. M., Ballesteros, L. A., Carlson A., and St. Amant, R. (1994). Path analysis models of an autonomous agent in a complex environment. *Selecting Models from Data: AI and Statistics IV*, Cheeseman, P., and Oldford, R. W., eds. Springer, pp. 243-251.

### RESEARCH FUNDING:

*Toward Cognitive Habile Agents* (PI). National Science Foundation. January, 2006 - December, 2008. \$375,266.

*ITR: Intelligent Human-Machine Interface and Control for Highly Automated Chemical Screening Processes* (co-PI). National Science Foundation. August, 2004 - August, 2007. \$748,132.

*MAVEN: Model-based Automated Visualization for Enhanced Situation Awareness* (co-PI). Army STTR. August, 2004. \$30,000.

*US Germany Workshop Towards an International Research Partnership Program on Human-Automation Interaction in the Life Sciences* (co-PI). National Science Foundation. September, 2004. \$58,699.

*AAAI/SIGART Doctoral Consortium* (PI, American Association for Artificial Intelligence). National Science Foundation. July, 2004. \$14,000.

*ITR: Integrating Intrusion Detection with Intelligent Visualization and Interaction Strategies* (co-PI). National Science Foundation. September, 2002 - July, 2005. \$415,099.

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*Using Cognitive Models to Examine Human-Robot Interfaces: An Exploratory Study* (PI, subcontract to the Pennsylvania State University). Space and Naval Warfare Systems Center (SPAWAR), San Diego. May, 2001 - May, 2002. \$65,419.

*Interactive Exploration of Complex Datasets Via the Effective Generation of Text and Graphics* (co-PI). National Science Foundation. September, 2000 - September, 2003. \$570,000.

*User Interface Softbots* (PI). National Science Foundation. August, 2000 - August, 2003. \$497,384.

*MIPER: Mixed-Initiative Plan Evaluation and Repair* (PI, subcontract to the University of Massachusetts). DARPA/Rome Laboratory. August, 1997 - June, 2001. \$234,869.

*IDIOM: An Intelligent, Dynamically Manipulable Simulation for High School Physics Education* (PI). The William R. Kenan Institute for Engineering, Technology, and Science. September, 1998 - August, 2000. \$70,000.

*Online Financial Investment via Interactive Search and Visualization* (co-PI). AngelsStreet.com. August, 1999 - June, 2000. \$210,975.

*o3c: intelligent support for online shopping* (co-PI). Centennial Venture Partners/Lichtin Corporation. June, 1999 - December, 1999. \$207,658.

### EXTERNAL COLLABORATIONS:

Carole Beal (University of Southern California/ISI), Michael D. Byrne (Rice University), Paul R. Cohen (University of Southern California/ISI), Michael Fotta (Innovative Management & Technology Services), Wayne D. Gray (Rensselaer Polytechnic Institute), Sam Horodezky (Qualcomm), Henry Lieberman (Massachusetts Institute of Technology), Frank E. Ritter (Pennsylvania State University), Scott Wood, Jack Zaiantz (Soar Technology).

### REFERENCES:

Available on request.