

# Curriculum Vitae

## *Stephen M. Lee-Urban, Ph.D.*

### Education

*Ph.D. Computer Science*  
Lehigh University  
2012, *summa cum laude*

*M.S. Computer Science*  
Lehigh University  
2005, *summa cum laude*

*B.S. Computer Engineering*  
Lehigh University  
2003, *summa cum laude*

- Specialization: Artificial Intelligence
- Diss.: *Hierarchical Planning Knowledge for Refining Partial-Order Plans*
- Advisor: Dr. Héctor Muñoz-Avila
- Thesis: *TMK Models to HTNs: Translating Process Models into Hierarchical Task Networks*
- Participant in the selective “Engineering Co-Op” program, requiring 8+ months full-time work experience before graduation

### Select Experience

*Instructor of Record*  
School of Interactive Computing  
College of Computing,  
Georgia Institute of Technology  
Summers of 2013, '15, '16, '20  
Spring 2018, Fall 2019 & 2020

*Senior Research Scientist,  
Research Scientist II*  
Georgia Tech Research Institute  
Fall 2013–present

*Course Creator, Instructor*  
Georgia Tech Professional  
Education  
Fall 2019, Spring 2020

*Postdoctoral Fellow,  
Research Scientist*  
Entertainment Intelligence Lab  
Georgia Institute of Technology  
Winter 2011–Fall 2013

*Technical Lead*  
CaseWorks LLC., through  
Georgia Institute of Technology  
(for Walt Disney Imagineering)  
Winter 2011–Fall 2011

*Dean’s Teaching Assistant*  
Lehigh University  
Fall 2010

- CS 4731 / CS 7632 – Undergraduate / Graduate Game Artificial Intelligence
- CS 3600 – Introduction to Artificial Intelligence
- Complete responsibility over course
- Student evaluations rank among the highest at Georgia Tech
- First instructor to teach Intro to AI and Game AI as fully remote offerings
- Fundamental and applied research in several domains, including spectrum (communications and radar), cyber operations, LVC training, multi-agent systems, modeling & simulation, natural language, and explainable AI
- Emphasis on creating, implementing, and evaluating cognitive systems and hybrid AI/ML architectures
- Course: Introduction to Applied Artificial Intelligence for Naval Systems
- Introduced Navy engineers, developers and program managers to the fundamentals and applications of AI and ML ranging from knowledge-based and episodic techniques to data-driven statistical analysis
- Researched “narrative computing” – creating computational systems that understand and use “narrative,” a fundamental part of human cognition
- Techniques applied include plan repair, genetic algorithms, and crowd-sourcing; responsibilities included project management and student mentoring
- Technical lead on AI project contracted for Walt Disney Imagineering
- A non-disclosure agreement limits my ability to discuss details
- Lead on AI design, system architecture, software implementation, technology-team management, and client communication
- CSE 17, CSE 18 – Structured Programming and Data Structures
- The DTA is considered prestigious: must be nominated and selected through interviews and is only available to one PhD student per department

*Instructor of Record*  
Lehigh University  
Summer 2010

- Lectured select classes (over 10 full lectures), helped design assignments and exams, held office hours and graded all material
- CSE 15 – Introduction to Computer Science (4 credit, non-elective course)
- Responsibilities: Complete responsibility over the course – created syllabus and all course content, taught daily, and ran weekly lab
- Student evaluation: 5.0/5.0 (highest)

*Research Assistant*  
Lehigh University, InSyTe Lab  
Fall 2004 – Winter 2011

- Automated plan generation, plan adaptation / repair, and case-based reasoning
- Evaluated AI/ML algorithms in games, planning language translation
- Mentored a number of masters students and undergraduates on research
- Collaborations: Universidad Complutense de Madrid, UMD College Park
- Funding sources: NRL, NSF, DARPA

*Teaching Assistant*  
Lehigh University  
Fall 2003, Spring 2004

- CSE 12, CSE 15, CSE 16, CSE 17, CSE 197, CSE 327, and CSE 342
- Abbreviated course descriptions:
  - senior / graduate level computer networks and network-programming
  - sophomore level C++ programming
  - senior level introduction to artificial intelligence
  - game AI
  - multimedia introduction to computer science
- Responsibilities included debugging/grading student C/C++ programs, conducting weekly labs, teaching select lectures, and 1-on-1 tutoring

*Software Developer*  
AirClic  
<http://www.airclic.com>  
Fall 2001, Summers of 2002/4

- Collaborative, rapid-prototype software development with Java, SQL, XSLT, Apache Tapestry, Apache Ant, Junit, LDAP, Oracle DB; client/server scripts
- Responsible throughout software lifecycle including creating requirement specifications, implementation, testing, and code maintenance.

*Computer Specialist*  
Strack Associates  
Summer/Winter 2000

- Designed, coded, and deployed custom MS Access program to organize and control tax information database; hardware/software administrator

## Select Research Interests

*Narrative Computing*

- Much of the research I performed as a postdoc at Georgia Tech was in this area, which can be thought of enabling computational systems to tell and understand stories (a fundamental part of human cognition).

*Automated Planning*

- My dissertation topic is in this area which includes automated plan generation, repair, and adaptation, with an emphasis in partial-order planning and a form of hierarchical planning knowledge (akin to HTN planning).

*Game AI*

- Games are among the most complex and interesting software systems, and are excellent “simulators” in which to test AI/ML. I have used games as a testbed for much scientific (non-game) AI research, and am passionate about Game AI from an industry perspective as well.

*Case-based Reasoning,  
Cognitive Architectures,  
and Machine Learning*

- Reinforcement learning, cognitive architectures, and case-based reasoning based-approaches have proven to be among the most effective in my experience, impressing me with their real-world applicability.

*Software Agents*

- My approach to evaluate AI/ML algorithms in games has often been to create “bots” (non-player characters), which are a form of software agents. I have also applied software agents and agent-based simulation to the spectral (communication), social and cyber domains.

## Publications

### Conference Papers

- Odom, P., Hebard, R., & Lee-Urban, S. (2019). HuManIC: Human Machine Interpretive Control. In *Proceedings of the 24th International Conference on Intelligent User Interfaces: Companion*
- Whitaker, E., & Lee-Urban, S. (2016). Intelligent Agent Representations of Malware: Analysis to Prepare for Future Cyber Threats. In *proceedings of the 7th International Conference on Applied Human Factors and Ergonomics*, 2016. Orlando, FL.
- Lee-Urban, S., Whitaker, E., Riley, M., & Trehwitt, E. (2016). Two Complementary Network Modeling and Simulation Approaches to Aid in Understanding Advanced Cyber Threats. In *proceedings of the 7th International Conference on Applied Human Factors and Ergonomics*, 2016. Orlando, FL.
- Trehwitt, E. B., Lee-Urban, S., Odom, J., Guinn, M., Lewis, T., Riley, M., Dickerson, M., Whitaker, E. T., Thurmond, G., Tornquist, E. (2015). Analysis of the Use of Intelligent Agents in Cyber Operations Testing. In *Proceedings of the US Army Operations Research Symposium (AORS) 2015*. Aberdeen, MD.
- Trehwitt, E. B., Lee-Urban, S., Odom, J., Guinn, M., Lewis, T., Riley, M., Whitaker, E. T., Thurmond, G., Tornquist, E. (2015). Intelligent Agents in Cyber Operations Testing. In *ITEA Test Technology Review*. Huntsville, AL.
- Li, B., Lee-Urban, S., and Riedl, M. (2013) Crowdsourcing interactive fiction games. *Proceedings of the 8th International Conference on the Foundations of Digital Games*, Chania, Crete, Greece, 2013.
- Li, B., Lee-Urban, S., Johnston, G., and Riedl, M. (2013) Story Generation with Crowdsourced Plot Graphs. *Proceedings of the 27th AAAI Conference on Artificial Intelligence*, Bellevue, Washington, 2013.
- Li, B., Lee-Urban, S., Appling, D.S., and Riedl, M. (2012) Crowdsourcing Narrative Intelligence. *Advances in Cognitive Systems*, vol. 2, 2012.
- Zook, A., Lee-Urban, S., Riedl, M., Holden, H., Sottolare, R., and Brawner, K. (2012) Automated Scenario Generation: Toward Tailored and Optimized Military Training in Virtual Environments. *Proceedings of the 7th International Conference on the Foundations of Digital Games*, Raleigh, North Carolina, 2012.
- Gillespie, K., Karneeb, J., Lee-Urban, S., and Munoz-Avila, H. (2010) Imitating Inscrutable Enemies: Learning from Stochastic Policy Observation, Retrieval and Reuse. *Proceedings of the 18th International Conference on Case Based Reasoning (ICCBR 2010)*. Springer.
- Lee-Urban, S., Munoz-Avila, H. (2009) Adaptation Versus Retrieval Trade-Off Revisited: an Analysis of Boundary Conditions. In *Proceedings of the 8th International Conference on Case-Based Reasoning (ICCBR-09)*. Springer.
- Auslander, B., Lee-Urban, S., Hogg, C., and Munoz-Avila, H. (2008) Recognizing The Enemy: Combining Reinforcement Learning with Strategy Selection using Case-Based Reasoning. In *Proceedings of the 9th European Conference on Case-Based Reasoning (ECCBR-08)*. Springer.
- Vasta, M., Lee-Urban S. & Muñoz-Avila, H. (2007) RETALIATE: Learning Winning Policies in First-Person Shooter Games. In *Proceedings of the Seventeenth Innovative Applications of Artificial Intelligence Conference (IAAI-07)*. AAAI Press.
- Warfield, I., Hogg, C., Lee-Urban, S., Muñoz-Avila, H. (2007) Adaptation of Hierarchical Task Network Plans. In *Proceedings of the Twentieth Flairs International Conference (FLAIRS-07)*. AAAI Press.
- Lee-Urban, S. Muñoz-Avila, H. (2006) A study of Process Languages for Planning Tasks. In *Proceedings of the sixteenth International Conference on AI Planning and Scheduling (ICAPS-06) Doctoral Consortium*.
- Hoang, H., Lee-Urban, S., and Muñoz-Avila, H. (2005) Hierarchical Plan Representations for Encoding Strategic Game AI. In *Proceedings of Artificial Intelligence and Interactive Digital Entertainment Conference (AIIDE-05)*. AAAI Press.

## *Book Chapters*

- Hogg, C., Lee-Urban, S., Muñoz-Avila, H., Auslander, B., Smith, M. Game AI for Domination Games. In Pedro Gonzales Calero (Ed.) *Artificial Intelligence for Computer Games*. Springer Verlag, 2011.
- Lee-Urban, S., Smith, M. & Munoz-Avila, H. 2008. Learning Winning Policies in Team-Based First-Person Shooter Games. *AI Game Programing Wisdom 4*. Charles River Media.

## *Theses*

- Lee-Urban, S. Hierarchical Planning Knowledge for Refining Partial-Order Plans. Doctoral Thesis, 2012.
- Lee-Urban, S. TMK Models to HTNs: Translating Process Models into Hierarchical Task Networks. Master's thesis, 2005.

## *Workshop Papers*

- Li, B., Appling, D. S., Lee-Urban, S., and Riedl, M. (2012) Learning Sociocultural Knowledge via Crowdsourced Examples. *Proceedings of the 4th AAAI Workshop on Human Computation*, Toronto, Canada, 2012.
- Li, B., Lee-Urban, S. and Riedl, M. (2012) Toward Autonomous Crowd-Powered Creation of Interactive Narratives. *Proceedings of the 5th AAAI Workshop on Intelligent Narrative Technologies*, Palo Alto California, 2012.
- Zook, A., Lee-Urban, S., Drinkwater, M., and Riedl, M. (2012) Skill-based Mission Generation: A Data-driven Temporal Player Modeling Approach. In *Proceedings of the 3rd Workshop on Procedural Content Generation in Games*, Raleigh, North Carolina, 2012.
- Li, B., Lee-Urban, S., Appling, D.S., and Riedl, M. (2012) Automatically Learning to Tell Stories about Social Situations from the Crowd. In *Proceedings of the LREC 2012 Workshop on Computational Models of Narrative*, Istanbul, Turkey, 2012.
- Hogg, C., Lee-Urban, S., Auslander, B., and Munoz-Avila, H. (2008) Discovering Feature Weights for Feature-Based Indexing of Q-Tables. In *Proceedings of the Uncertainty and Knowledge Discovery in CBR Workshop at the 9th European Conference on Case-Based Reasoning (ECCBR-08)*.
- Sanchez-Ruiz, A., Lee-Urban, S., Muñoz-Avila, H., Diaz-Agude, B., & Gonzalez-Calero, P. (2007) Game AI for a Turn-based Strategy Game with Plan Adaptation and Ontology-based retrieval. In *Proceedings of the workshop on Planning in Games at the International Conference on Automated Planning and Scheduling (ICAPS-07)*.
- Lee-Urban, S., Parker, A., Kuter, U., Muñoz-Avila, H., & Nau, D. (2007) Transfer Learning of Hierarchical Task-Network Planning Methods in a Real-Time Strategy Game. In *Proceedings of the AI Planning and Learning Workshop (AIPL) at the International Conference on Automated Planning and Scheduling (ICAPS-07)*.
- Ponsen, M., Lee-Urban, S., Muñoz-Avila, H., Aha, D., and Molineaux, M. (2005) Stratagus: An Open-Source Game Engine for Research in Real-Time Strategy Games. *Workshop for International Joint Conference on Artificial Intelligence (IJCAI-05)*.

## Honors and Awards

- 2013
  - **Recipient**, The GT College of Computing Outstanding Post-Doctoral Research Award (The Georgia Institute of Technology)
- 2011
  - **Recipient**, Dean's Teaching Assistant (Lehigh U.). Awarded to advanced Ph.D. students with a *demonstrated interest in teaching* at the university level, possessing skills needed to provide high quality assistance in the classroom
- 2008
  - **Recipient**, Graduate Student Life Leadership Award (Lehigh U.). Awarded for "exemplary scholarship, leadership, and service to the Lehigh graduate student community"
  - **Awarded Membership**, Rossin Doctoral Fellows Program (RDF, Lehigh U.). This program is for high potential Ph.D. candidates interested in pursuing academic careers, and helps hone teaching, research and presentation skills
- 2006
  - **Recipient**, ICAPS Doctoral Consortium Scholarship
- Fall 2003 – Spring 2004
  - **Recipient**, Presidential Scholarship (Lehigh U.). Given for "outstanding academic achievement by undergraduate students"
  - **Member**, Tau Beta Pi Engineering Honor Society
  - **Two-time Recipient**, American Legion School Award. Awarded to two outstanding students graduating from Junior and Senior High Schools who exhibit exceptional scholarship, leadership, service and honor

## Service

- 2019
  - **Coach & Committee Member**, GTRI-ICL Promotion Peer Review Committee
- 2017 – Present
  - **Vice-President**, IEEE Computer Society, Atlanta section
- 2016
  - **Local Co-chair**, 2016 International Conference on Case-Based Reasoning
- 2015 & 2016
  - **Volunteer organizer**, GT Cognitive Brownbag Seminar Series
- Fall 2010 – Summer 2011
  - **Chair**, Computer Science and Engineering Department's Graduate Research Seminar Series
  - **Volunteer**, student panel for the Computer Science and Engineering accreditation process
- Fall 2009 – Spring 2010
  - **Search Committee Member**, for the position of Vice President and Associate Provost for Research and Graduate Studies (sole Graduate Student)
- Fall 2007 – Spring 2010
  - **Executive-board Member**, Graduate Student Senate (Communications Officer)
- 2008
  - **Volunteer**, IT Infrastructure Planning Committee
  - **Host**, Board of Trustee's "experiential learning" visit
  - **Graduate Student Representative**, Engineering Advisory Board
- 2007
  - **Orientation Ambassador**, incoming Fall 2007 graduate students
  - **Member**, Computer Science and Engineering Advisory Board
- Fall 2006 – Spring 2007
  - **Representative** of Computer Science Department, Graduate Student Senate
- Fall 2004 – Present
  - **Reviewer**, conference publications including AAAI, FLAIRS, ICCBR, ECCBR, ICAPS, AIIDE, and IEEE Transactions on Computational Intelligence and AI in Games (not all conferences all years)