

KAREN ZITA HAIGH

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USA

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Work Experience

BBN Technologies, Cambridge, Massachusetts, USA.

July 2011 – present. Senior Scientist, Networking Technologies Group.

November 2005 – July 2011. Senior Scientist, Intelligent Distributed Computing Group.

Performed research developing and embedding cognitive techniques in complex systems. Published technical papers and prepared patents. Managed projects with teams of other scientists. Conceived and wrote proposals to customers, predominantly DARPA. Led and participated in other strategic planning & business development activities including customer visits and opportunity tracking.

Selected Projects:

POKE. Probe-Observe Knowledge Engine. 2015-current. PI. Model RF emitters through passive and active means, with a focus on repetitive behaviours, how emitters respond to one-another, and how emitters are connected. ONR Cognitive EW.

CommEx. Communications in the Extreme. 2011-current. Optimize network performance in the presence of previously-unknown interference and jamming conditions. Technical lead for learning blue performance surface and developing realtime optimization approach. DARPA/STO CommEx.

POIROT. Plan Order Induction by Reasoning from One Trial. 2006-2010. Hypothesis former lead. Develop workflow models from one training example, using multistrategy learning to develop testable hypotheses about model structure. DARPA/IPTO Integrated Learning.

CSISM. Cognitive Support for Intelligent Survivability Management. 2007-2008. Protection from zero-day cyber attacks. Developed machine learning techniques to generalize single attacks by exploring axes of vulnerability. DARPA/IPTO Self Regenerative Systems (SRS).

ADROIT. Adaptive Dynamic Radio Open-source Intelligent Team. 2005-2007. Cognitive Lead. Create an open-source composable network architecture suitable for cognitive control that adapts in real-time to changes in the environment and user needs. ADROIT's cognitive control mechanism is the first known real-world system (not simulation) to use machine learning to dynamically control MANET radio behaviour. DARPA/STO Adaptive Cognition-Enhanced Radio Teams (ACERT).

Honeywell Laboratories, Minneapolis, Minnesota, USA.

May 2001 – November 2005. Principal Research Scientist, Automated Reasoning Group.

June 1998 – May 2001. Senior Research Scientist, Automated Reasoning Group.

Performed research in machine learning, planning, knowledge management and other fields of artificial intelligence for automated systems such as robots, refineries, aircraft and intelligent homes. Published technical papers and prepared patents. Managed projects with small teams of other scientists. Conceived and wrote proposals to customers including DARPA, NASA and NIST.

Selected Projects:

LifeCare. 2004-2005. Productization strategies for in-home monitoring of elderly clients, including sensing modalities, reasoning algorithms, strategic partnerships, and IP issues.

VQL. Visual Query Language. 2003-2005. PI. An interactive tool for searching for patterns in time series data. Patents pending.

PTM. Predictive Trend Monitoring. 2003-2004. Analysis of aircraft engine data for early event detection.

NASA-EED. NASA Early Event Detection. 2002-2003. Analysis of data from International Space Station and Shuttle Columbia for early event detection.

I.L.S.A. Independent LifeStyle Assistant™. 2000-2003. PI. An intelligent, adaptive home automation system with a sophisticated situation awareness and decision-making capabilities that

reason over a diverse set of sensors, medical devices and “smart” appliances to enable elderly and infirm users to live and function safely at home. I.L.S.A. was a multiagent system that incorporated a unified sensing model, probabilistically derived situation awareness, intent recognition, hierarchical task network response planning, real-time action selection control, machine learning and human factors. First system of its nature in a field currently heavily researched. NIST Advanced Technology Program. Multiple patents.

Education

Carnegie Mellon University, Pittsburgh, Pennsylvania, USA.

Ph. D. (Computer Science), February 1998.

Thesis title: [Situation-Dependent Learning for Interleaved Planning and Robot Execution](#)

Thesis Committee: M. Veloso (chair), T. Mitchell, R. Simmons, R. J. Firby (Neodesic Corporation)

Designed and built a robot learning system that uses feedback from execution experience to improve efficiency of generated plans.

University of Ottawa, Ottawa, Ontario, Canada.

B. Sc. (Honours Computer Science), April 1992, *summa cum laude*

Selected Presentations & Publications (of 91 total)

1. Karen Zita Haigh, "Cognitive Learning and Decision Making for EW," To be presented in *52nd Annual AOC International Symposium and Convention: Synchronizing EW and Cyber to Achieve Spectrum Dominance, December 1-3, 2015*, Washington, DC.
2. K. Z. Haigh, A. M. Mackay, M. R. Cook, L. G. Lin, [Parallel Learning and Decision Making for a Smart Embedded Communications Platform](#). August 2015, BBN Technical Report BBN-REPORT-8579.
3. K. Z. Haigh, "Cognitive Learning and Decision Making for EW," *Cognitive Radio Frequency Technical Exchange Symposium*, AFRL, Rome, NY. August 2015. [Abstract](#) and [presentation](#).
4. K. Z. Haigh, "Learning to choose communication strategies to mitigate interference," keynote presentation to *Georgia Tech Research Institute Technical Series: "Cognitive-Adaptive Processing"*, Atlanta, GA. May 2014.
5. K. Z. Haigh, H. Mostafa, J. Como, D. Egnor, "Modeling RF Interference Performance," *43rd Annual Collaborative Electronic Warfare Symposium*, Pt. Mugu, CA, April 2014
6. K. Z. Haigh, J. Tranquilli, D. Egnor, H. Mostafa, G. Noubir, S. Roche, R. Sundaram, "Optimizing Mitigation Strategies: Learning to choose communication strategies to mitigate interference," *Classified US Military Conference*, McLean, VA, 2013.
7. Karen Zita Haigh and Fusun Yaman. "[RECYCLE: Learning Looping Workflows from Annotated Traces](#)." In *ACM Transactions on Intelligent Systems and Technology*. 2:4(Article number 42), 2011.
8. K. Z. Haigh and N. Rychtyckyj, editors, *Proceedings of the Twenty-First Innovative Applications of Artificial Intelligence Conference*, July 2009, AAAI Press, Menlo Park, CA.
9. D. Moore, M. Thome, Dr. K. Z. Haigh, [Scripting Your World: The Official Guide to Scripting in Second Life](#). Wiley, 2008.
10. K. Z. Haigh, T. S. Hussain, C. Partridge, G. D. Troxel, "[Rethinking Networking Architectures for Cognitive Control](#)." *Microsoft Research Cognitive Wireless Networking Summit 2008*, 5-6 June 2008. Snoqualmie, WA.
11. K. Z. Haigh, S. Varadarajan, C. Y. Tang, "[Automatic Learning-based MANET Cross-Layer Parameter Configuration](#)," in *IEEE Workshop on Wireless Ad hoc and Sensor Networks (WWASN)*, Lisbon, Portugal 2006.
12. K. Z. Haigh, L. M. Kiff, G. Ho. "[The Independent LifeStyle Assistant™ \(I.L.S.A.\): Lessons Learned](#)." *Assistive Technology*, 18:87-106. 2006.

13. K. Z. Haigh, D. J. Musliner, S. Ghosh, "RT-MLab: Really Real-Time Robotics," In *Proceedings of Workshop on Life Cycle Software Engineering Technology for Modern Avionics, Missiles, and Smart Weapon Systems*, Huntsville, AL, August 2000.

Selected Patents (of 17 total)

1. D. Mankins, G. D. Troxel and K. Z. Haigh. *System, device and method for unifying differently routed networks using virtual topology representations*. U.S. Patent number [8,139,504](#), issued 20 March 2012.
2. K. Z. Haigh, W. Foslien, V. Guralnik, *Method and Apparatus for Identifying Data of Interest in a Database*, U.S. Patent Application Serial No. [20070112754](#), filed 15 November 2005. European patent [WO2007059034 \(A1\)](#).
3. K. Z. Haigh, L. M. Kiff, V. Morellas, *Monitoring Devices*, U.S. Patent Application Serial No. [10/878,952](#), filed 28 June 2004. European patent number [EP1916639 \(A2\)](#) or [KR20070029760 \(A\)](#).
4. C. A. Miller, W. L. Dewing, K. Z. Haigh, D. C. Toms, R. P. Whillock, C. W. Geib, S. V. Metz, R. M. R. Richardson, S. D. Whitlow, J. A. Allen, L. A. King, J. Phelps, V. A. Riley and P. Wu. *A method for monitoring, recognizing, supporting and responding to the behaviour of an actor*, U.S. Patent Application Serial No. [10/341,335](#), filed January 10, 2003. European patent [WO03083800 \(A1\)](#).
5. W. L. Dewing, L. Stickler, C. A. Miller, K. Z. Haigh, R. M. R. Richardson, R. P. Whillock and S. Whitlow, *System and method for assessing the functional ability or medical condition of an actor*. U.S. patent [7,244,231](#), awarded 17 July 2007.

Awards

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| 2007-current: | BBN Publication Award |
| 2007-current: | BBN Business Development Award |
| 2001: | Honeywell Technical Achievement Award |

Professional Activities

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| 2015-current: | Member of IEEE (Institute of Electrical and Electronics Engineers) |
| 1996-current: | Member of AAAI (American Association of Artificial Intelligence) |
| 2009-2012: | Editorial Board, <i>ACM Transactions on Intelligent Systems and Technology</i> |
| 2009,2010: | Guest Editor, <i>AI Magazine, Special Issue on Innovative Applications of Artificial Intelligence</i> |
| 2009: | Chair, Innovative Applications of Artificial Intelligence |
| 2008: | Co-chair, Innovative Applications of Artificial Intelligence |
| 2007: | Chair, DARPA Information Science & Technology study on " <i>Engineering Ensemble Effects</i> " |
| 2003, 2005, 2007: | Panel member, National Science Foundation |
| 2002: | Chair, AAAI-02 workshop "Automation as Caregiver: The Role of Intelligent Technology in Elder Care" |
| 2001: | Six Sigma Greenbelt Certification |

Personal

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| Languages: | Native English. Good French and Mandarin Chinese. |
| Citizenship: | Canada, United Kingdom, United States. |