Ruth Jennifer Schulz – Curriculum Vitae

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Profile:

- I am a cognitive scientist and robot enthusiast who believes that technology should work for people in the real world. I am interested in developments that enable technology to be used intuitively and to work in the existing built environment.
- My research interests include robot language, navigation, artificial intelligence, social robots, and human-robot interactions.
- My technical skills include:
  - Targets – (advanced) Windows, (intro) Linux, embedded (Atmel)
  - Languages – (advanced) C, MATLAB, (intro) C++, Java
  - Artificial Intelligence – Neural Networks, Search, Bayesian Networks, Decision Trees
  - Interaction Design – Usability evaluation
  - Middleware – (intro) ROS, GLUT
  - Robots – Pioneer 3 DX, Guiabot

Professional Experience:

- **Research Fellow,** QUT, *January 2014 – June 2016*
  Combining my interests in language, navigation and robotics to develop a system for robots to navigate through built environments using cues that humans use on the ARC Discovery Project "*Human Cues for Robot Navigation*"; supervising PhD and final year engineering students; co-lecturing "*Microprocessors and Digital Systems*"

- **Lecturer**, QUT, *July 2013 – December 2013*
  Organising the QUT SEF Showcases for final year students completing capstone projects in Engineering, IT, and Games; co-lecturing "*Introduction to Robotics*"

- **Research Scientist**, CSIRO, *January 2013 – June 2013*
  Producing quality research and technical input for the "*Mobile Telepresence for Museums*" and "*Strategic Lightweight Robotics*" projects, including usability recommendations for the user interfaces of the museum robot, booking system, and information system

- **Research Fellow,** The University of Queensland, *July 2008 – December 2012*
  Combining my interests in language and robotics in the "*Lingodroids*" project, with the big picture goal of developing robots that can understand human language; supervising honours and masters students; lecturing "*Artificial Intelligence*"

- **Robotics Tutor,** The University of Queensland, *February 2005 – December 2005*
  Tutoring introductory robotics to school classes (year 5 to year 12); assisting with the organisation of a robotics competition

- **Design Engineer**, EDMI Limited, *February 2004 – February 2005*
  Providing usability recommendations for metering software; research and development of a wireless metering device

- **Research Assistant,** The University of Queensland, *December 2000 – January 2004*
  Assisting with cognitive science projects, including investigations into evolutionary algorithms and the Baldwin effect (the result of interactions between learning and evolution)

Education:

- **Doctor of Philosophy in Computer Science**, The University of Queensland, *Completed 27/11/2008*
  Topic: *Spatial Language for Mobile Robots: The Formation and Generative Grounding of Toponyms*
- **Bachelor of Engineering (Electrical) with Honours Class I and Bachelor of Science (Computer Science)**, The University of Queensland, *Completed 8/12/2003*
  Thesis Topic: *Interface for an Automated Cocktail Maker*

Awards and Achievements:

- Best Student Paper Award ACRA 2015: Talbot, B., Schulz, R., Upcroft, B., & Wyeth, G. (2015). Reasoning about natural language phrases for semantic goal driven exploration. *ACRA 2015, Australasian Conference on Robotics and Automation*, Australian National University, Canberra, A.C.T, 2-4 December 2015.
- CSIRO ICT Centre Teamwork Award 2013 as part of the Mobile Telepresence for Museums Project
- COSNet Overseas Travel Grant to attend Evolang, March 2008
- Valedictorian for the Faculty of Engineering, Physical Sciences and Architecture, School of Information Technology and Electrical Engineering, 2003

Publications:

According to Google Scholar on 23/9/16: 29 publications, 149 citations, h-index = 6, i10-index = 5

- *Book Chapter*

  Wyeth, G., Milford, M., Schulz, R., and Wiles, J. (2011). The RatSLAM project: Robot spatial navigation. In Jeffrey L. Krichmar and Hiroaki Wagatsuma (Ed.), *Neuromorphic and brain-based robots* (pp. 87-108) Cambridge, United Kingdom: Cambridge University Press.

- *Journal Papers*

  Milford, M. & Schulz, R., (2014). Principles of goal-directed spatial robot navigation in biomimetic models. *Philosophical Transactions of the Royal Society B : Biological Sciences*, 369(1655), pp. 1-13.

  Schulz, R., Wyeth, G., and Wiles, J., (2012). Beyond here-and-now: Extending shared physical experiences to shared conceptual experiences, *Adaptive Behavior*. 20(5), 360-387.

  Heath, S., Schulz, R., Ball, D., and Wiles, J. (2012). Long summer days: Grounded learning of words for the uneven cycles of real world events, *IEEE Transactions on Autonomous Mental Development*. 4(3), 192-203.

  Schulz, R., Wyeth, G., and Wiles, J. (2011). Lingodroids: Socially grounding place names in privately grounded cognitive maps. *Adaptive Behavior*, 19 6: 409-424.

  Schulz, R., Wyeth, G., & Wiles, J. (2011). Are We There Yet? Grounding Temporal Concepts in Shared Journeys. *IEEE Transactions on Autonomous Mental Development*, 3(2), 163-175.

  Milford, M., Schulz, R., Prasser, D., Wyeth, G., & Wiles, J. (2007). Learning spatial concepts from RatSLAM representations. *Robotics and Autonomous Systems - From Sensors to Human Spatial Concepts*, 55(5), 403-410.

- *Conference Papers*

  Talbot, B., Lam, O., Schulz, R., Dayoub, F., Upcroft, B., & Wyeth, G. (2016) Find my office: Navigating real space from semantic descriptions. *ICRA 2016, The International Conference on Robotics and Automation*, Stockholm, Sweden, May 2016.

  Sunderhauf, N., Dayoub, F., McMahon, S., Talbot, B., Schulz, R., Corke, P., Wyeth, G., Upcroft, B., & Milford, M. (2016) Place categorization and semantic mapping on a mobile robot. *ICRA 2016, The International Conference on Robotics and Automation*, Stockholm, Sweden, May 2016.

Lam, O., Dayoub, F., Schulz, R., & Corke, P. (2015) Automated topometric graph generation from floor plan analysis. *ACRA 2015, Australasian Conference on Robotics and Automation*, Australian National University, Canberra, A.C.T, 2-4 December 2015.

Talbot, B., Schulz, R., Upcroft, B., & Wyeth, G. (2015). Reasoning about natural language phrases for semantic goal driven exploration. *ACRA 2015, Australasian Conference on Robotics and Automation*, Australian National University, Canberra, A.C.T, 2-4 December 2015.

Hou, J., Schulz, R., Wyeth, G., & Nayak, R. (2015). Finding within-organisation spatial information on the web. In Maher, Michael & Thiebaux, Sylvie (Eds.) *28th Australasian Joint Conference on Artificial Intelligence* (AI 2015), 30 November – 4 December 2015, Canberra, A.C.T.

Schulz, R., Talbot, B., Upcroft, B., & Wyeth, G. (2015). Constructing abstract maps from spatial descriptions for goal-directed exploration. *Robotics: Science and Systems 2015 Workshop on Model Learning for Human-Robot Communication*, Rome, Italy, July 2015.

Schulz, R., Talbot, B., Lam, O., Dayoub, F., Corke, P., Upcroft, B., & Wyeth, G., (2015). Robot navigation using human cues: A robot navigation system for symbolic goal-directed exploration, *ICRA 2015, The International Conference on Robotics and Automation*, Seattle, USA, May 2015.

Lam, O., Dayoub, F., Schulz, R., & Corke, P., (2014). Text recognition approaches for indoor robotics: a comparison, *ACRA 2014, Australasian Conference on Robotics and Automation*, University of Melbourne, Melbourne, VIC, 2-4 December 2014.

Heath, S., Ball, D., Schulz, R., and Wiles, J., (2013). Communication between Lingodroids with Different Cognitive Capabilities, *ICRA 2013, The International Conference on Robotics and Automation*, Karlsruhe, Germany, May 2013.

Schulz, R., Ward, B., Roberts, J., (2013). Interactions with a Museum Telepresence Robot, *ICRA 2013 Workshop Human Robot Interaction (HRI) for Assistance and Industrial Robots, Scientific Knowledge, Standards and Regulatory Framework. How do I design for the real world?*, Karlsruhe, Germany, May 2013.

Heath, S., Schulz, R., Ball, D., and Wiles, J., (2012). Lingodroids: learning terms for time, *ICRA 2012, The International Conference on Robotics and Automation*, Saint Paul, Minnesota, USA, May 2012.

Schulz, R., Whittington, M., and Wiles, J., (2012). Language change in socially structured populations, In T. C. Scott-Phillips, M. Tamariz, E. A. Cartmill, and J. R. Hurford (Eds.), *The Evolution of Language: Proceedings of the 9th International Conference (EVOLANG9)* (pp312-319). Singapore: World Scientific Press.

Schulz, R., Glover, A., Milford, M., Wyeth, G., & Wiles, J. (2011) Lingodroids: Studies in Spatial Cognition and Language, *ICRA 2011, The International Conference on Robotics and Automation*, Shanghai, China, May 2011

Schulz, R., Glover, A., Wyeth, G., & Wiles, J. (2010). Robots, communication, and language: An overview of the Lingodroid Project, in G. Wyeth and B. Upcroft (Eds), *Proceedings of the 2010 Australasian Conference on Robotics & Automation*, Brisbane, Australia, 2010.

Glover, A., Schulz, R., Wyeth, G., & Wiles, J. (2010). Grounding action in visuo-haptic space using experience networks, in G. Wyeth and B. Upcroft (Eds), *Proceedings of the 2010 Australasian Conference on Robotics & Automation*, Brisbane, Australia, 2010.

Schulz, R., Wyeth, G., & Wiles, J. (2010), Language change across generations for robots using cognitive maps. In H. Fellermann, M. Dörr, M. M. Hanczyc, L. L. Laursen, S. Maurer, D. Merkle, P.-A. Monnard, K. Stoy and S. Rasmussen (Eds.), *Artificial Life XII: Proceedings of the Twelfth International Conference on the Synthesis and Simulation of Living Systems*. (pp. 581-588). Cambridge, Massachusetts: The MIT Press.

Schulz, R., Prasser, D., Stockwell, P., Wyeth, G., & Wiles, J. (2008). The formation, generative power, and evolution of toponyms: Grounding a spatial vocabulary in a cognitive map. In A. D. M. Smith, K. Smith & R. Ferrer i Cancho (Eds.), *The Evolution of Language: Proceedings of the 7th International Conference (EVOLANG7)* (pp. 267-274). Singapore: World Scientific Press.

Schulz, R., Milford, M. J., Prasser, D., Wyeth, G., & Wiles, J. (2006). *Learning spatial concepts from RatSLAM representations*. Paper presented at "From sensors to human spatial concepts" at the International Conference on Intelligent Robots and Systems, Beijing, China.

Schulz, R., Stockwell, P., Wakabayashi, M., & Wiles, J. (2006). Towards a spatial language for mobile robots. In A. Cangelosi, A. D. M. Smith & K. Smith (Eds.), *The Evolution of Language: Proceedings of the 6th International Conference on the Evolution of Language.* Singapore: World Scientific Press.

Schulz, R., Stockwell, P., Wakabayashi, M., & Wiles, J. (2006). Generalization in languages evolved for mobile robots. In L. M. Rocha, L. S. Yaeger, M. A. Bedau, D. Floreano, R. L. Goldstone & A. Vespignani (Eds.), *ALIFE X: Proceedings of the Tenth International Conference on the Simulation and Synthesis of Living Systems*. (pp. 486-492). Cambridge, Massachusetts: The MIT Press.

Wiles, J., Schulz, R., Bolland, S., Tonkes, B., & Hallinan, J. (2001). Selection procedures for module discovery: Exploring evolutionary algorithms for cognitive science. In J. D. Moore & K. Stenning (Eds), *Proceedings of the 23rd Annual Conference of the Cognitive Science Society (CogSci 2001)*. (pp. 1124-1129). Mahwah, NJ: Lawrence Erlbaum Associates.

Wiles, J., Schulz, R., Hallinan, J., Bolland, S. & Tonkes, B. (2001). Probing the persistent question marks. In L. Spector, E. Goodman, A. Wu, W. B. Langdon, H.-M. Voigt, M. Gen, S. Sen, M. Dorigo, S. Pezeshk, M. Garzon & E. Burke (Eds), *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2001)*. (pp. 710-717). San Francisco, CA: Morgan Kaufmann Publishers.

Personal Interests:

- Taekwon-do (Training with Bai Rui Taekwon-do since 2004, currently a 4th Degree Black Belt), Sewing, Running, Reading, Swimming

Languages:

- English – Native speaker
- Norwegian – Conversational
- German – Basic

References:

- Available on Request