

## **Pentti O A Haikonen, Dr.**

Vermonrinne 17 E  
FI-00370 Helsinki  
Finland  
[pentti.haikonen@pp.inet.fi](mailto:pentti.haikonen@pp.inet.fi)  
Mobile: +358 40 184 7735

### **Academic Degrees**

Doctor of Technology, Helsinki University of Technology 1999  
Licentiate in Technology, Helsinki University of Technology 1982  
MSc (Electronics engineering), Helsinki University of Technology 1972

### **Academic positions:**

Adjunct Professor, University of Illinois at Springfield, 2009 -  
Special lecturer, video technology, Helsinki University of Technology, 1983 – 1993  
Special lecturer, cognitive technology, Helsinki University of Technology, 2000

### **Current board memberships:**

Advisory board member, Journal of Cognitive Computation  
Editorial board member, International Journal of Machine Consciousness (IJMC)  
Board member of Finnish Artificial Intelligence Society

### **Research Interests**

Philosophy of cognition, consciousness, artificial intelligence and machine consciousness. The problem of qualia from theoretical and practical aspects. Engineering approaches towards cognitive and conscious machines.

### **Awards**

Finnish Engineering Award 1990  
Electronic Engineers Society Award 1989  
Philips national contest for young inventors in Finland, First Prize, 1969

### **Work history**

Nokia Research Center, Principal Scientist, Cognitive Technology 1991 – 2009  
Vistacom Industries, Engineering Manager, 1986 – 1991 (Development of digital video transmission)  
Technical Research Centre of Finland, Senior Researcher, 1977 – 1986 (analog and digital systems research)  
Salora Swaziland Ltd, (Swaziland Africa), Engineering Manager, 1975 – 1977 (television manufacturer)  
Salora oy Finland, Know-how engineer, 1974 – 1975  
Nokia oy, RF Design Engineer, 1973 – 1974  
Military service 1972 – 1973

### **Scientific visits:**

Visiting Scientist (Gast Wissenschaftler), Heinrich Hertz Institute, Berlin, two months 1982

### **Short UNIDO assignments:**

Libya 1983, expert on mission, electronics industry, 10 days  
Egypt 1986, expert on mission, electronics industry, one month

## Patents

14 patents.

## Languages:

Finnish  
English  
German

## Links:

Demo videos etc. here:

<http://www.youtube.com/user/PenHaiko>

<http://personal.inet.fi/cool/pentti.haikonen/>

## Publications

### Books:

Pentti O A Haikonen: *Consciousness and Robot Sentience*. Singapore: World Scientific, 2012

Pentti O A Haikonen: *Robot Brains; circuits and systems for conscious machines*. UK: John Wiley & Sons, 2007

Pentti O A Haikonen: *The Cognitive Approach to Conscious Machines*. UK: Imprint Academic, 2003

Pentti O A Haikonen: *Videotekniikka* (Video Technology, in Finnish), 1992

### Dissertation:

Haikonen, P. O. A. (1999). *An Artificial Cognitive Neural System Based on a Novel Neuron Structure and a Reentrant Modular Architecture with Implications to Machine Consciousness*. Dissertation for the degree of Doctor of Technology, Helsinki University of Technology, Applied Electronics Laboratory, Series B: Research Reports B4

## Recent Journal and Conference Papers & Book Chapters:

- Haikonen Pentti O. A. (2013). Consciousness and Sentient Robots. *International Journal of Machine Consciousness (IJMC)*. Volume 5 No 1 (Jun 2013)
- Haikonen Pentti O. A. (2012). Consciousness and the Quest for Sentient Robots. In A. Chella, R. Pirrone, R. Sorbello, K. R. Johannsdottir (Eds.). *Biologically Inspired Cognitive Architectures 2012*. Springer, Heidelberg. pp 19 - 27
- Haikonen Pentti O. A. (2011). Too Much Unity: A Reply to Shanahan. *APA Newsletter on Philosophy and Computers*. Volume 11 No 1 (Fall 2011) pp. 19 – 20
- Haikonen Pentti O. A. (2011). Flawed Workspaces? *APA Newsletter on Philosophy and Computers*. Volume 10 No 2 (Spring 2011) pp. 2 – 4
- Haikonen Pentti O. A. (2011). XCR-1: An Experimental Cognitive Robot Based on an Associative Neural Architecture. *Cognitive Computation*: Volume 3 No 2, pp 360-366
- Haikonen Pentti O. A. (2010). An Experimental Cognitive Robot. In A. V. Samsonovich et al. (Eds.) *Biologically Inspired Cognitive Architectures 2010*. IOS Press, Amsterdam. pp. 52 – 57
- Haikonen Pentti O. A. (2010). Quasi-Quantum Computing in the Brain? *Cognitive Computation*. Volume 2. Volume 2 No 2. pp 63 – 67
- Haikonen Pentti O. A. (2009). Qualia and Perception Missing. A Reply to Franklin, Baars, and Ramamurthy. *APA Newsletter on Philosophy and Computers*. Vol. 9, No 1 Fall 2009 p. 15
- Haikonen Pentti O. A. (2009). Slippery Steps Towards Phenomenally Conscious Robots. *APA Newsletter on Philosophy and Computers*. Vol. 8, No 2 Spring 2009 p. 4
- Haikonen Pentti O. A. (2009). The Challenges for Implementable Theories of Mind. *Journal of Mind Theory* Volume 0 No 1. pp 99 – 110
- Haikonen Pentti O. A. (2009). Machine Consciousness: New Opportunities for Information Technology Industry. *International Journal of Machine Consciousness (IJMC)*. Volume 1 No 2 (December 2009) pp. 181-184
- Haikonen Pentti O. A. (2009). Qualia and Conscious Machines. *International Journal of Machine Consciousness (IJMC)*. Volume 1 No 2 (December 2009) pp. 225 – 234
- Haikonen Pentti O. A. (2009). Tekoälyn olemassaolo ja tietoisuus (The existence of Artificial Intelligence and Consciousness) *Niin & Näin* 3/2009 (in Finnish, publisher: The Society for European Philosophy) pp. 45 - 47

- Haikonen Pentti O. A. (2009). The Role of Associative Processing in Cognitive Computing. *Cognitive Computation*. Volume 1 No 1 (March 2009)
- Haikonen Pentti O. A. (2008). Towards "Natural" Natural Language in Machine Cognition. <http://www.mind-consciousness-language.com/Haikonen1.pdf>
- Haikonen, Pentti O. A. (2007). Essential Issues of Conscious Machines. *Journal of Consciousness Studies*, Volume 14 No. 7, pp. 72 – 84
- Haikonen, Pentti O. A. (2007). Reflections of Consciousness: The Mirror Test. *Papers from the AAI Fall Symposium, Technical Report FS-07-01* pp. 67 – 71
- Haikonen, Pentti O. A. (2006). Towards Streams of Consciousness; Implementing Inner Speech. In T. Kovacs and J. Marshall (Eds.), *Proceedings of the AISB06 Symposium*, vol. 1. pp. 144 – 149. The Society for the study of Artificial Intelligence and the simulation of behaviour, UK.
- Haikonen, Pentti O. A. (2005). Artificial Minds and Conscious Machines. In: Darryl N. Davis (ed.) *Visions of Mind*. USA: Information Science Publishing. pp. 254 – 274
- Haikonen, Pentti O. A. (2005). You Only Live Twice: Imagination in Conscious Machines. In R. Chrisley, R. W. Clowes & S. Torrance (Eds.), *Proceedings of the AISB05 Symposium on Next Generation approaches to Machine Consciousness: Imagination, Development, Inter-subjectivity, and Embodiment*. pp. 19 – 25. The Society for the study of Artificial Intelligence and the simulation of behaviour, UK.
- Haikonen Pentti O. A. (2002). "Emotional Significance in Machine Perception and Cognition" *IASTED International Conference on Artificial Intelligence and Applications (AIA 2002)* September 9-12, 2002 Málaga, Spain
- Haikonen Pentti O. A. (2000). "A Modular Neural System for Machine Cognition", *Proceedings of the IEEE-INNS-ENNS International Joint Conference on Neural Networks IJCNN 2000* Como 24. – 27. July 2000, 47 – 50.
- Haikonen Pentti O. A. (2000). "An Artificial Mind via Cognitive Modular Neural Architecture", *Proceedings of the AISB'00 Symposium on How to Design a Functioning Mind*, University of Birmingham 17. – 20. April 2000, 85 – 92.
- Haikonen Pentti O. A. (1998). "An Associative Neural Model for a Cognitive System" *Proceedings of International ICSC/IFAC Symposium on Neural Computation NC'98* Vienna 23 - 25 September 1998 pp. 983 - 988
- Haikonen Pentti O. A. (1998). "Machine Cognition via Associative Neural Networks" *Proceedings of Engineering Applications of Neural Networks EANN'98* Gibraltar 10 - 12 June 1998 pp. 350 – 357
- Haikonen, Pentti O. A. (1998). "Assessor, a machine with functional consciousness" <http://www.zynet.co.uk/imprint/Tucson/3.htm#Assessor, a machine with functional consciousness>. *Toward a Science of Consciousness 1998 "Tucson III"* April 27 - May 2, 1998, The University of Arizona, Tucson, Arizona
- Haikonen Pentti O. A. (1994). "A Novel Neuron for Associative Neural Networks", in *Conference on Artificial Intelligence Research in Finland STep-94, Proceedings of Contributed Session Papers* pp. 9 - 12, 1994 Finnish Artificial Intelligence Society, Helsinki
- Haikonen Pentti O. A. (1994). "Towards Associative Non-algorithmic Neural Networks", *Proceedings of IEEE International Conference on Neural Networks ICNN'94 Vol II* pp. 746 – 750 Orlando, June 28 - July 2, 1994
- Haikonen Pentti O. A. (1993). "Basic Requirements for Cognitive and Conscious Machines", *Neural Network Research in Finland Symposium* proceedings pp. 19 - 25, 1993 Finnish Artificial Intelligence Society, Helsinki