

CV

Karl Ægir Karlsson PhD

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EDUCATION

2005 PhD: The University of Iowa; Iowa City, USA

- In my PhD studies I employed *in vivo* electrophysiology, pharmacology, lesioning, tract tracing, as well as histological and behavioral analysis in studies aimed at elucidating mechanisms of sleep development. These efforts lead to multiple publications and a PhD in *Behavioral and Cognitive Neuroscience*, defended in February 2005.

2002 MA: The University of Iowa; Iowa City, USA

- Field of study: *Behavioral and Cognitive Neuroscience*.

1999 BA: The University of Iceland; Reykjavík, Iceland

- Field of study: *Psychology*. As an undergraduate in psychology I placed special emphasis on physiological psychology and philosophy of science.

PROFESSIONAL AND ACADEMIC EXPERIENCE

2006-Present: Assistant Professor Reykjavik University; Reykjavík, Iceland

- I currently hold the position of assistant professor in biomedical engineering. Main duties include: conducting research, teaching advanced neurophysiology and introductory cell- and molecular biology in addition to performing various administrative tasks.

During 2005: Postdoctoral Scholar UCLA; Los Angeles, USA

- I held the position of a postdoctoral scholar in the laboratory of Dr. Jerome Siegel professor at the UCLA School of medicine and the Veterans Administration during the year of 2005. During my time with Dr. Siegel I participated in unique human experiments where microdialysis was employed to assess the secretion patterns of hypocretin/orexin peptides in relation to sleep-wake cycles. This work, which is still unpublished, is near completion.

2000-2005: Research Assistant, the University of Iowa, Iowa City, USA

- Main duties included: basic lab work, animal care, data collection and analysis.

1999-2000: Sleep Technician the National University Hospital Reykjavík, Iceland

- Main duties included: maintenance of clinical sleep lab equipment, conducting polysomnography and sleep stage scoring.

1985-1998: Sailor

- I was a sailor (deckhand, cook, and mate) on various fishing vessels in Icelandic waters.

SCHOLARSHIP

Peer reviewed manuscripts in English

- Porsteinsson, H. & Karlsson, K.Æ. Is sleep beyond our control? *The Open Sleep Journal. In Press.*
- Mohns, E. J., Karlsson, K. Æ., & Blumberg, M.S. (2007) Developmental emergence of transient and persistent hippocampal events and oscillations and their association infant seizure susceptibility. *European Journal of Neuroscience. Vol 26*, 2719-2730.
- Blumberg, M.S., Karlsson, K. Æ. & Seelke, A.M. (2007) Sleep, development and human Health. *Sleep. Vol 30*, 5, 549-550.
- Karlsson, K.Æ., Vianna Di Prisco, G., Mohns, E.J. & Blumberg M.S. (2006) On the Co-expression of Startles and Sharp Waves in Newborn rats. *Hippocampus. Vol*, 11, 959-965.
- Mohns, E. J., Karlsson, K. Æ., & Blumberg, M.S. (2006) The Ventrolateral Preoptic Area and Basal Forebrain Play Opposing Roles in the Descending Modulation of Sleep and Wakefulness in Infant Rats. *European Journal of Neuroscience. Vol 20*, 1301-1310.
- Blumberg, M.S., Seelke, A. M., Lowen, S.B., & Karlsson, K. Æ. (2005) Dynamics of Sleep-Wake Cyclicity in Developing Rats. *Proceedings of the National Academy of Sciences. Vol*, 102, 14860-14864.
- Seelke, A. M., Karlsson, K. Æ., Gall, A. J. & Blumberg M. S. (2005) Extraocular Muscle Activity, Rapid Eye Movements, and the Development of Active and Quiet Sleep. *European Journal of Neuroscience. 22*, 911-920.
- Karlsson, K. Æ., Gall, A. J. Mohns, E. J. & Blumberg, M.S. (2005) The Neural Substrates of Infant Sleep in Rats. *Public Library of Science Biology. 3(5)*: e143
- Karlsson, K. Æ. & Blumberg, M.S. (2005) Active Control of Atonia in Week-Old Rats. *Neuroscience. 130*, 275-283.
- Blumberg, M.S., Karlsson, K. Æ., Seelke, A.M.H. & Mohns, E. (2004) The Ontogeny of Mammalian Sleep: A Reply to Frank and Heller (2003). *Journal of Sleep Research*, 14, 91-101.
- Karlsson, K. Æ. & Blumberg, M.S. (2004) Temperature-Induced Reciprocal Activation of Hippocampal Field Activity in vivo. *Journal of Neurophysiology*, 91, 583-588.
- Karlsson, K. Æ., Kreider, J.C. & Blumberg, M.S. (2004) Hypothalamic Contributions to Sleep-Wake Cycle Development, *Neuroscience*, 123, 575-582.
- Karlsson, K. Æ. & Blumberg, M. S. (2003). Hippocampal Theta in the Newborn Rat is Revealed Under Conditions That Promote REM sleep. *The Journal of Neuroscience*, 23(4) 1114-1118.
- Karlsson, K. Æ., & Blumberg, M. S. (2002). Union of the State: Myoclonic Twitching is Coupled with Muscle Atonia in Infant Rats. *Behavioral Neuroscience*, 116, 912-917.

Peer reviewed manuscripts in Icelandic

- Karlsson, K. Æ., Ingadottir, S., Halldorsdottir, B., Gislason, T., & Bjornsson, E. (2004) Ambulatory measurements are better tolerated than in-hospital measurements of sleep apnea. *Læknablaðið (Journal of the Icelandic Medical Association)*. Vol 90, 311-3.
- Karlsson, K. Æ. (2000). What makes Wittgenstein a non-behaviorist? *Hugur (Icelandic Journal of Philosophy)*. Vol 10-11, 88-100 .

Non-peer reviewed publications

- Fjölvar Darri Rafnsson, Karl Ægir Karlsson & Matthías Gísli Þorvaldsson (2000). Ungir Ökumenn. Reykjavík, Dómsmálaráðuneytið. (Report for the Icelandic ministry of Justice).
- Af hverju sofum við? Morgunblaðið (Lesbók) 20. maí 2006. (Article about sleep for the general public in Icelandic).

Conference Presentations

- K.Æ. Karlsson, I.Þ. Jóhannesdóttir, H. Arnardóttir, H. Þorsteinsson. The ontogeny of sleep-wake cycles in zebrafish. The 6th European Genetics and Development Meeting, 2009, Rome.
- Karlsson, K.Æ., Þorsteinsson, H., Reynisson, H.M., Sigurðardóttir, L.Ý., Dagbjartsson, A. Behavioral correlates of direct-current coupled EEG activity in premature humans. Society for Neuroscience, 2009, Chicago.
- Moser, E., Derntl, B., Gerstl, F., Robinson, S., Karlsson, K.Æ., & Windischberger, C. Functional MR-imaging of human emotions: towards single subject diagnosis. World Congress of Medical Physics and Biomedical Engineering, 2009, München
- Karlsson K.Æ., Gertsch, F., Windischberger, C., Siegel, J.M., Moser, E. Valence - dependent modulation of hypothalamic activity. Society for Neuroscience 2008, Washington DC.
- Karlsson K.Æ., Reynisson, H.M. Patterns of electrographic activity and movement in premature humans. International Society for Developmental Psychobiology, 2008, Washington DC.
- Moser, E., Windischberger, C., Gerstl, F., Karlsson, K.Æ. Very funny and sad stimuli modulate BOLD-response in the human hypothalamus. European Society for Magnetic Resonance in Medicine and Biology, 2008, Valencia, Spain.
- Sævarsson, G., Keating, G., Arnarsson, H., Hilmarsson, Ó., Karlsson, K.Æ., Decker, M. Validation of commercially available rodent polysomnographic scoring algorithm. Associated Professional Sleep Societies, 2008, Minneapolis MN.
- Fürsatz, M., Windischberger, C., Karlsson K.Æ., Moser, E. Successful fMRI of the hypothalamus at 3T. International Society for Magnetic Resonance in Medicine 2008, Toronto, Canada.
- Fürsatz, M., Windischberger, C., Karlsson K.Æ., Mayr, W., Moser, E. Valence - dependent modulation of hypothalamic activity. Human Brain Mapping 2008. Melbourne, Australia.
- Blouin, A., Fried I., Staba, R., Behnke., Lam, H.A., Maidment, N.T., Karlsson K.Æ., Ackerson, L.C., Wilson, C.L., Siegel, J.M. Hypocretin release during wake and sleep in the human brain. Society for Neuroscience 2007, San Diego, CA.
- Mohs, E.J., Karlsson K.Æ., & Blumberg M.S. Effects of Modafinil on Developing Sleep Patterns in Infant Rats. Society for Neuroscience 2005, Washington, DC.
- Karlsson K.Æ., Mohs, E.J., Vianna di Prisco, G., & Blumberg M.S. Are Hippocampal Sharp Waves and Startles Causally Linked? Society for Neuroscience 2005, Washington, DC.

- Seelke, A.M.H., Karlsson, K.Æ., Gall, A. & Blumberg, M. The Ontogeny of Sleep-Related Phasic Activity in the Infant Rat. International Society for Developmental Psychobiology, 2005, Washington, DC.
- Mohns, E.J., Karlsson K.Æ., & Blumberg M.S. The Ventrolateral Preoptic Area and Basal Forebrain Play Opposing Roles in the Descending Modulation of Sleep-Wake Cyclicity in Infant rats.
- Associated Professional Sleep Societies 2005, Denver, CO. Karlsson, K. Æ. Mohns, E.J., & Blumberg, M. S. The Neural Substrates of Infant sleep.
- Associated Professional Sleep Societies 2005, Denver, CO. Karlsson, K. Æ. & Blumberg, M. S. Medullary Control of REM Sleep Atonia in Infant Rats. Society for Neuroscience 2004, San Diego CA.
- Mohns, E., Karlsson, K. Æ. & Blumberg, M. S. Hypothalamic Modulation of Sleep-Wake Cyclicity in Infant Rats. Society for Neuroscience 2004, San Diego CA.
- Karlsson, K. Æ. & Blumberg, M. S. Effects of Brain Temperature on Hippocampal Activity in Anesthetized Infant Rats. Society for Neuroscience 2003, New Orleans, LA.
- Blumberg, M.S., Karlsson, K. Æ. and Kreider, J.C. Hypothalamic Contributions to Sleep Cycle Development, Society for Neuroscience 2003, New Orleans, LA.
- Karlsson, K. Æ. & Blumberg, M. S. Nuchal Atonia and Hippocampal Theta Characterize the Sleep of Rats as Two days of Age. Associated Professional Sleep Societies 2003, Chicago, IL.
- Karlsson, K. Æ. & Blumberg, M. S. Active sleep or REM sleep: Lets call the whole thing off. Society for Neuroscience 2002, Orlando, FL.
- Karlsson, K. Æ. & Blumberg, M. S. Hippocampal Theta in Neonatal Rats. International Society for Developmental Psychobiology, 2002, Orlando, FL.
- Karlsson, K. Æ. & Blumberg, M. S. Union of the State: An Argument for Developmental Continuity Between Active and REM sleep. International Society for Developmental Psychobiology, 2001, San Diego, Cal.
- Karlsson K. Æ., Bjornsson E, Halldorsdottir B, Ingadottir S, Gislason T. Patients prefer ambulatory CPAP follow-up compared to in-hospital. European Sleep Research Society, 2000, Istanbul, Turkey.
- Karlsson K. Æ., Kjartansson G, Gunnarsdottir A, Ingadottir S, Gislason T, Tomasson K. Health related quality of life in untreated sleep apnea syndrome and after one year of CPAP treatment. European Sleep Research Society, 2000, Istanbul, Turkey.

Talks and Public Lectures

- *Hypothalamic Contributions to Sleep Cycle Development: The Role of the Medulla.* Associated Professional Sleep Societies, 2004, Philadelphia, PA.
- *The Ontogeny of Hippocampal Population Patterns.* Northwestern University, Chicago, IL. 2004.
- *Hypothalamic Contributions to Sleep Cycle Development.* International Society for Developmental Psychobiology, 2003, New Orleans, LA.
- *The Neural Substrates of Infant Sleep.* Reykjavik University, Reykjavik, Iceland, winter 2006.

- *Sleep in infants: Beyond control.* University of Iceland, Reykjavik, Iceland, fall 2006.
- *Er svefn nauðsynlegur?* Verk og Vit, Reykjavík winter 2007.
- *Svefn: ungir og aldnir.* Hjartavernd, Reykjavík spring 2007
- *Sharp waves and startles: A mechanistic link between two early neonatal sleep events.* The 12th nordic sleep conference, Bergen, Norway, spring 2007.
- *Hypocretin og virkni þess í svefni og vöku.* Læknadagar, National University Hospital, January 2008.
- *Sleep, emotion and the human brain.* Experiment marathon. Reykjavik Art Gallery 2008.
- *Measuring sleep in complex and simple organisms.* Measuring Behavior Conference, Maastricht, Holland 2008.

TEACHING EXPERIENCE

- I have been active in teaching since I begun at RU. Below is a table listing the courses that I have taught. I have generally received high student ratings. In addition to the list of courses listed in the table I have taught classes in neurophysiology; supervised a research project for a medical student and supervised an MSc thesis in psychology; all at the University of Iceland.

Teaching at RU since 2006

Semester	Class	ID	Score*	Comments
2009 Spring	Sleep	T-424-SLEE	4.3	Primary teacher
2009 Spring	Instruments and vital signs	T-510-MALI	4.3	Co-teacher (50%)
2008 Fall	Research methods I	T-801-RES1	4.1	Primary teacher
2008 Fall	Molecular and Cell Biology	T-106-LIFV	3.2	Primary teacher
2008 Spring	Physiology II	T-205-LIF2	N/A	Co-teacher (20%)
2008 Spring	Research methods and statistics	AT-ADF1013	3.3	Primary teacher
2008 Spring	Research methods I	T-801-RES1	4.8	Primary teacher
2007 Fall	Research methods I	T-801-RES1	3.7	Primary teacher
2007 Fall	Instruments and vital signs	T-510-MALI	N/A	Co-teacher (50%)
2007 Fall	Physiology III	T-306-TAUG	3.4	Co-teacher (20%)
2007 Spring	Neural plasticity	T-309-MTTT	4.5	Primary teacher
2006 Fall	Research methods	T-842-REPO	4.2	Co-teacher (50%)
2006 Fall	Physiology III	T-306-TAUG	4.6	Co-teacher (20%)

*indicates average student evaluation of teaching quality (on a 0-5 scale; 5 being highest)

SERVICE

Service to Reykjavik University

- My time at RU has been a time of massive expansion that I have participated actively in. Perhaps my largest contribution has been in forming and building the biomedical engineering program. This includes: designing the curriculum, teaching classes that have not been taught before, contributing to the strategy of the unit, and in general building an atmosphere conducive to research. In addition to this I have been vocal and visible representative of the University in public and professional circles. This includes numerous interviews, articles, lectures and demonstrations that I have held for non-scientific audience.

- 2006 – 2008: Active in a committee working closely with the architects and engineers designing the new RU campus advising on new constructions.
- 2006 – Current: Member of a three person committee overseeing new faculty hiring in the BME area.
- 2008 – Current: Member of the RU Research council.
- 2009 – Current: Head of the School of Science and Engineering Research Council. In the first months in this role I contributed significantly in writing research strategy for the school and writing the application for permit to graduate PhD's (submitted in May 2009).
- 2007: Sat in a committee which designed the first system of distributing government research contribution between the five schools of the University.
- 2007- 2008: Key account manager for RU MIT Industrial Liaison Program.
- 2007 – Current: An active member of APERIO program. APERIO is a RU based program aimed at finding and giving exceptional students the opportunity to flourish.
- 2009 – Current: Have contributed to the build of a Psychology program within RU.

Other service

- Ad hoc reviewer for the journals: Epilepsia, Behavioral Brain Research, Sleep and Behavioral Neuroscience.
- Ad hoc reviewer the Associated Professional Sleep Societies annual conference 2007, 2008 and 2009.
- Reviewer of grant proposals for the Icelandic Centre for Research (RANNÍS).
- Reviewer of grant proposals for the National University Hospital of Iceland.
- Served as a student member on the faculty recruiting committee for the Behavioral and Cognitive Neuroscience training area at the University of Iowa 2004-5.
- Consultant to start-up company SignalOne (www.signalone.is).

PROFESSIONAL MEMBERSHIP

- Society for Neuroscience (SFN).
- Sleep Research Society (SRS).
- International Society for Developmental Psychobiology (ISDP).
- Co-founder and first chairman of the Icelandic Society for Neuroscience (ISfN; www.ti.is).

AWARDS

- **The University of Iowa 2005 Lewis award.** Awarded annually in honor of Professor Don Lewis to “a graduate student that shows great promise to become a highly productive scientist”.
- **The 2005 National Bank of Iceland award** for outstanding performance in PhD studies abroad.
- **The 2004 Gormezano Research Award.** Awarded annually to an outstanding student of the behavioral and cognitive neuroscience training area at the University of Iowa.

- **American-Scandinavian Research Fellowship;** Thor Thors Memorial Fund. Awarded for the school year of 2002-2003.
- **The 2004 Sleep Research Society's Trainee Merit Based Travel Award** for the Associated Professional Sleep Societies meeting in 2004. Included was an opportunity to give a lecture at the meeting.
- **NIH travel award** to attend the International Society for Developmental Psychobiology meeting in 2002.
- **NIH travel award** to attend the International Society for Developmental Psychobiology meeting in 2001.

FUNDING

- **Marie Curie International Reintegration Grant:** Awarded by the European Research Council in June 2006 for the project "Sleep Development". Direct costs: 80.000 Euros over three years.
- **Icelandic Research Council:** Pilot grant awarded in June 2006 to complete a research/grant proposal bringing together talent from the United States, Iceland, and Austria. The aim is to employ state-of-the-art 7T fMRI to understand the human hypocretin system. Direct costs: 500.000 ISK.
- **Icelandic Research Council:** Project grant awarded in February 2007 funding a project where aim is to utilize fMRI to understand the human hypocretin system. Direct costs: 4.200.000 ISK over one and a half year.
- **Icelandic Research Council:** Pilot grant awarded in April 2007 for funding a project where it is attempted to use novel statistical methods to characterize behavioral states precocial fetal mammals. Direct costs: 500.000 ISK.
- **Icelandic Student Innovation Fund:** Same as above.
- **Icelandic Research Council:** Equipment grant awarded in April 2007 for funding the purchase of various lab equipment for sleep research using zebrafish (*Danio rerio*) as a model system. Direct costs: 1.500.000 ISK over one year.
- **Icelandic Research Council:** Grant awarded in April 2007 for funding salaries and running costs of sleep research using zebrafish (*Danio rerio*) as a model system. Direct costs: 14.000.000 ISK over three years.
- **Reykjavik University Development Fund.** Project grant awarded in April 2007 for continuation fMRI-based methods aimed at understanding the human hypocretin system; in particular the neural underpinnings of cataplectic attacks. Direct costs: 2.700.000 ISK (single installment).
- **Reykjavik University Development Fund.** Grant awarded in August 2008 for funding salaries and running costs of sleep research using zebrafish (*Danio rerio*) as a model system. Direct costs: 3.200.000 ISK over one year.
- **Icelandic Research Council:** Equipment grant awarded in January 2009 for funding the purchase equipment for in vitro electrophysiology. Direct costs: 4.493.000 ISK over one year.
- **Reykjavik University Development Fund.** Grant awarded in the fall of 2008 to fund salaries for a post-doctoral fellow in my laboratory. Direct costs: 2.490.000 ISK.

- **Reykjavik University Development Fund.** Grant awarded in April of 2009 to fund a microarray-based project aimed at elucidating sleep-wake modulation of gene expression in zebrafish. Direct costs: 2.500.000 ISK.
- **Icelandic Research Council:** Equipment grant awarded in May 2009 for funding the purchase equipment for in vitro electrophysiology. Direct costs: 6.314.000 ISK over one year.

PRESS COVERAGE

Press coverage of: Karlsson et al., (2005) The Neural Substrates of Infant Sleep in Rats (*PLoS Biology*. 3(5): e143).

- Medical News Today: accessed 20th of April 2005 at 16:45
<http://www.medicalnewstoday.com/medicalnews.php?newsid=23032>
- The Washington times: accessed 20th of April 2005 at 16:46
<http://washingtontimes.com/upi-breaking/20050418-091758-8038r.htm>
- National Geographic: accessed 20th of April 2005 at 16:47
http://news.nationalgeographic.com/news/2005/04/0419_050419_sleep.html
- Washington Post: accessed at May 9th 2005 at 09:10
<http://www.washingtonpost.com/wp-dyn/content/article/2005/05/08/AR2005050800789.html>