

The genetic mechanisms of adaptation: Post-doc position in the Division of Computational Genetics, Department of Clinical Sciences, SLU, Uppsala, Sweden

A Post-doc position is available in a project where we study the genetic mechanisms of adaptation. In the project we do in-depth analyses of data from mainly two model systems: i) A long-term selection experiment in domestic chicken and ii) Large collections of natural *Arabidopsis thaliana* accessions. The focus in the project is to develop and use new quantitative-, population-, and evolutionary genetics approaches to analyze already available data. Depending on the background, competence and interests of the applicant, the project can be focused either on the development of new genetics theory, statistical methods, computational algorithms and bioinformatics tools, analyses of empirical data using methods developed by others working on the project, or a combination of the two. Examples of earlier work in this project include: Opinion articles 1. Carlborg, Ö. and Haley, C. Epistasis: too often neglected in complex traits studies? *Nature Reviews Genetics* 2004 5: 618-625. 2. Le Rouzic, A. and Carlborg, Ö. Evolutionary potential of hidden genetic variation. *Trends in Ecology and Evolution* 2008 23:33-37. 3. Nelson, R.M., Pettersson, M.E., Carlborg, Ö. A century after Fisher: time for a new paradigm in quantitative genetics. *Trends Genet.* 2013 29:669-76. Original publications 1. Carlborg, Ö., Jacobsson, L., Åhngren, P., Siegel, P., Andersson, L. Epistasis and the release of genetic variation during long-term selection. *Nature Genetics* 2006 38:418-20. 2. Alvarez-Castro, J. and Carlborg, Ö. A general model for functional and statistical epistasis and its application in QTL analysis. *Genetics* 2007 176: 1151-1167 3. Alvarez-Castro, J., le Rouzic, A. and Carlborg, Ö. How to perform meaningful estimates of genetic effects. *PLOS Genetics* 2008 May 2; 4(5):e1000062 4. Le Rouzic, A., Alvarez-Castro, J. and Carlborg, Ö. Dissection of the genetic architecture of body weight in chicken reveals the impact of epistasis on domestication traits. *Genetics* 2008 179:1591-1599. 5. Johansson, A.M., Pettersson, M.E., Siegel, P.B. and Carlborg, Ö. Genome-wide effects of long-term divergent selection. *PLoS Genet.* 2010 6(11):e1001188. 6. Pettersson, M.E., Besnier, F., Siegel, P. and Carlborg, Ö. 2011. Replication and explorations of high-order epistasis using a large Advanced Intercross Line pedigree. *PLOS Genetics*, Jul;7(7):e1002180. 7. Shen, X., Pettersson, M., RÅsnegÅLrd, L. and Carlborg, Ö. Inheritance beyond plain heritability: variance-controlling genes in *Arabidopsis thaliana*. *PLoS Genetics* 2012 8(8):e1002839. Epub 2012 Aug 2. 8. Nelson, R.M., Pettersson, M.P., LI, X., Carlborg, Ö. 2013. Variance heterogeneity in *Saccharomyces cerevisiae* expression data: trans-regulation and epistasis. *PLoS One.* 2013 8:e79507. 9. Shen, X., De Jonge, J., Forsberg, S., Pettersson, M., Sheng, Z., Hennig, L., and Carlborg, Ö. Natural CMT2 variation is associated with genome-wide methylation changes and temperature seasonality. *PLoS Genet.* 2014 10(12): e1004842 10. Lachowiec, J., Shen, X., Queitsch, C. and Carlborg, Ö. Highly epistatic genetic architecture of root length in *Arabidopsis thaliana*. *BIORXIV/2014/008789* To be suitable for the post, we believe that you have a thorough theoretical background in quantitative-, population- or evolutionary genetics and an interest in using this knowledge to improve our understanding of the genetic mechanisms contributing to adaptation via analyses of empirical data. You have probably also have experience in performing quantitative-, population- or evolutionary genetics analyses in empirical data. As we use R as a common platform for all our work, previous experience in R-programming is an advantage.

The post is available immediately and we are now looking for candidates

are available to start the post by April 1, 2015 at the latest.

Forms for funding or employment Employment as Post-doctoral researcher student for 1 year with possibility of extension 1+2 years. If you have questions about the post, us or our work, please contact Örjan Carlborg (

Orjan.Carlborg@slu.se

) We are looking forward to hearing from you!

Orjan.Carlborg@slu.se