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Computational Methods for High-Throughput Small RNA Analysis in Plants

Monteiro Morgado, Lionel

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ABOUT THE AUTHOR



Lionel Morgado was born in 1984 in Saint-Chamond, a commune in the Loire department in the Auvergne-Rhône-Alpes region in central France. Son of Portuguese immigrants, he moved with his family back to Portugal when he was just three years old. The following fifteen years he lived in Pinhel, a small historical town in the Northeast side of Portugal close to one of the main terrestrial borders with Spain. In 2002, he ingresses the first Biomedical Engineering class in the seven century old University of Coimbra, Portugal. Among his academic activity in the five years that followed, he co-founded E-BIOM (the Portuguese Association for Biomedical Students) and co-organized several scientific meetings, including the first Portuguese meeting of Biomedical Engineering students, an event which is still held once a year. After finishing his master degree in 2007, he endorsed a master program in Informatics Engineering in Coimbra while developing research at the Center for Informatics and Systems (CISUC) in the topic of Kernel Machines for large biological datasets. After graduating, he continued his research activity and at the same time started teaching at the Instituto Superior de Engenharia de Coimbra (ISEC), where he was Assistant Professor in multiple courses, mainly related to data mining and artificial intelligence.

By the end of 2011, the opportunity to develop research activity in epigenetics at the Groningen Bioinformatics Centre (GBiC) took him to the north of The Netherlands. The year of 2012, marked the official start of a doctorate degree that culminated in this thesis. During this time, and due to the dissolution of GBiC, he moved to Freising in Germany to continue his research at the Technical University of Munich for the period of one year.

List of publications

Morgado L, Johannes F (Submitted) Learning sequence patterns of AGO-sRNA affinity from high-throughput sequencing libraries to improve in silico functional sRNA detection and classification in plants.

Morgado L, Johannes F (Submitted) hibeRNAt: a framework for plant small RNA analysis.

Kooke R, **Morgado L**, Becker F, van Eekelen H, de Vos RCH, Johannes F, Keurentjes JJB (Submitted) Profiling of secondary metabolites in Arabidopsis epiRILs reveals mediators of the epigenotype-phenotype map.

Morgado L, Johannes F (2017) Computational tools for small RNA detection and categorization. Briefings in Bioinformatics. bbx136, <https://doi.org/10.1093/bib/bbx136>.

Morgado L*, Preite V*, Oplaat C, Anava S, de Carvalho JF, Rechavi O, Johannes F, Verhoeven KJF (2017) Small RNAs reflect grandparental environments in apomictic dandelion. Molecular Biology and Evolution msx150. doi: 10.1093/molbev/msx150.

Morgado L, Pereira C, Veríssimo P, Dourado A (2013) Efficient discriminative models for proteomics with simple and optimized features. Computational Intelligence and Decision Making - Trends and Applications, From Intelligent Systems, Control and Automation: Science and Engineering Bookseries 9: 89-98, Springer Verlag.

Colomé-Tatché M, Cortijo S, Wardenaar R, **Morgado L**, Lahouze B, Sarazin A, Etcheverry M, Martin A, Feng S, Duvernois-Berthet E, Labadie K, Wincker P, Jacobsen SE, Jansen RC, Colot V, Johannes F (2012) Features of the Arabidopsis recombination landscape resulting from the combined loss of sequence variation and DNA methylation. Proc Natl Acad Sci USA doi:10.1073/pnas.1212955109.

Pereira C, **Morgado L**, Correia D, Veríssimo P, Dourado A (2011) Kernel Machines for proteomics data analysis: algorithms and tools. 11th European Network for Business and Industrial Statistics, Coimbra, Portugal.

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Morgado L, Pereira C, Veríssimo P, Dourado A (2011) Peptidase detection and classification using enhanced kernel methods with feature selection. 5th International Conference on Practical Applications of Computational Biology and Bioinformatics.

Morgado L, Pereira C, Veríssimo P and Dourado (2010) PEPTILAB: a computational tool for peptidase data analysis. Workshop Applications of Computational Intelligence, Instituto Superior de Engenharia de Coimbra.

Morgado L, Pereira C, Veríssimo P, Dourado A (2010) A Support Vector Machine based framework for protein membership prediction. *Intelligent Systems, Control and Automation: Science and Engineering* 46, Springer.

Morgado L, Pereira C, Dourado A (2009) Ensemble of Kernel Machines for protein classification. Workshop Applications of Computational Intelligence, Instituto Superior de Engenharia de Coimbra.

Morgado L, Pereira C (2009) Incremental Kernel Machines for protein remote homology detection. Proc. of the Hybrid Artificial Intelligence Systems, 4th International Conference on Hybrid Artificial Intelligence Systems, Salamanca.

Morgado L, Pereira C (2008) Biological data analysis using incremental Kernel Machines: a comparative study. WACI'08 - Workshop on Applications of Computational Intelligence, Instituto Superior de Engenharia de Coimbra.

List of presentations

Morgado L, Johannes F. Learning sequence patterns of AGO-sRNA affinity from high-throughput sequencing libraries to improve functional sRNA categorization in plants. **Poster** presentation delivered at the 15th European Conference on Computational Biology, The Hague (The Netherlands), 5-7 September, 2016.

Morgado L, Johannes F. AGO-sRNA affinity to improve in silico sRNA detection and classification in plants. **Oral and poster** presentation delivered at the 10th International Workshop on Machine Learning in Systems Biology, The Hague (The Netherlands), 3-4 September, 2016.

Morgado L, Johannes F. Characterizing sequence patterns that guide small RNA sorting into Argonaute complexes in *A. thaliana*. **Oral and poster** presentation delivered at the Epigenetic and Chromatin Regulation of Plant Traits Conference, Strasbourg (France), 14-15 January, 2016.

Morgado L, Johannes F. Leveraging AGO-sRNA affinity to improve in silico sRNA detection and classification in plants. **Poster** presentation delivered at the 10th Benelux Bioinformatics Conference, Antwerp (Belgium), 7-8 December, 2015.

Preite V, Morgado L, Carvalho JF, Oplaat C, Anava S, Johannes F, Rechavi O, Verhoeven KJF. Small RNAs reflect the environment from grandparental generations in apomictic dandelions. **Poster** presentation delivered at the 16th Meeting of the EUCARPIA section biometrics in plant breeding, Wageningen (The Netherlands), 9-11 September, 2015.

Morgado L, Wardenaar R, Jansen RC, Johannes F. In search for the transgenerational epigenetic basis of complex traits. **Poster** presentation delivered at the 22nd GBB Symposium, Groningen (The Netherlands), September, 2014.

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Morgado L, Pereira C, Veríssimo P, Dourado A. Biological Data Mining using Incremental Kernel Machines: A Comparative Study. **Oral** presentation delivered at the International Symposium on Computational Intelligence for Engineering Systems, Instituto Superior de Engenharia do Porto (Portugal), November 18th, 2009.

Morgado L, Pereira C, Dourado A. Ensemble of Kernel Machines for protein classification. **Oral** presentation delivered at the WACI'09 - Workshop Applications of Computational Intelligence, Coimbra (Portugal), 2009.

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Huijser L, Cadinouche A, Mouysset L, Dulau-Drouot V (2015) Sperm whale (*Physeter macrocephalus*) social units and vocal clans in Mauritius. 29th Conference of the European Cetacean Society, Malta, 2015.