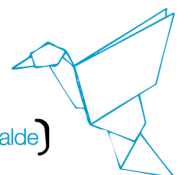


BCAM Internship Position Announcement

The following BCAM Internship position is open at BCAM – Basque Center for Applied Mathematics, an interdisciplinary research center located in Bilbao, Basque Country – Spain. The interested applicants can apply via the following webpage: <http://www.bcamath.org/en/research/internships>. It is strongly recommended to apply at least 3 months before the expected starting date.

INTERNSHIP DATA	
Research topic title:	Learning decomposable models with a bounded clique size using Integer Linear Programming
Research topic description:	<p>Decomposable models with a bounded clique size are an important family of graphical models due to their theoretical properties. Unfortunately, the problem of learning maximum likelihood decomposable models is known to be NP-hard. Recently an effective heuristic learning algorithm has been proposed based on integer linear programming (ILP) [1,2].</p> <p>The candidate will have to develop learning algorithms based on ILP methodologies proposed in [1,2] for learning decomposable models with a bounded clique size.</p> <p>The final goal of this study can be divided into three interrelated parts: i) to implement the different methodological proposals, ii) to perform experiments in artificial and real world data, and iii) to write a technical document summarizing the main theoretical and empirical findings obtained during the research. This work could lead to the participation in an international conference publication.</p> <p>[1] A. Pérez, et al. (2014) Learning Maximum Weighted (k+1)-Order Decomposable Graphs by Integer Linear Programming. European Conference on Probabilistic Graphical Models.</p> <p>[2] A. Pérez et al. (2018). An Approximate Formulation based on Integer Linear Programming for Learning Maximum Weighted (k+1)-order Decomposable Graphs. European Conference on Probabilistic Graphical Models.</p>



Keywords:	Graphical models, learning from data, integer linear programming
Required knowledge and skills:	-Programming in Python: numpy, scikit-learn, ... -Integer linear programming solvers in Python, e.g., Pulp -Probability and statistics -Priority to students who want to do the doctorate at BCAM
Required language skills¹:	Spanish or English
Duration and dates:	3-5 months, between August and December
Covered expenses:	To be negotiated
Application deadline:	20 th July 2019 (or until the position is filled)

SUPERVISOR DATA	
Supervisor:	Aritz Pérez
Research line:	Data Science, Machine Learning
Email:	aperez@bcamath.org

¹ Note that English is the official language at BCAM.