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**IBM France Lab  
Center for Advanced Studies  
9 rue de Verdun  
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## **Master II internship Applying optimization to Genotype Selection**

### **Context**

IBM France Lab integrates all of the IBM R&D located in France. One of the largest IBM Labs out of the USA, France Lab focuses on four complementary axis: Software Engineering, Mobile computing, Decision Automation and Management and Combinatorial Optimization. The lab includes more than 100 PhD and maintains strong connections with the French and European scientific communities as well as with the 11 IBM Research centers. Most projects at France Lab are multi-national involving IBMers from various countries and continents.

### **Theme**

Plant breeding is aiming at the improvement of crops for yield or quality. Recent progresses in genomics open perspectives for the development of new tools and approaches, but the very large amount of created data generate significant computing challenges. To ease these challenges, one possible approach would be to model the plant breeding process and to apply analytical methods to solve, at least partially, some of the problems. We propose to apply mathematical optimization in this genetic context to address these questions, where it should yield extremely interesting results. IBM CPLEX and IBM ODM Enterprise will be used to implement the resolution of the analytical problems.

### **Organisation:**

**Supervision:** the study will be performed under the supervision of both a mathematical optimization expert and a breeding expert, by a Master student who will be integrated in the CAS France within the larger France Lab organization.

**Timing:** the internship will be performed over Q2-Q4 2013.



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**Localization:** the internship will take place in Paris (or Sophia Antipolis) with strong and frequent interactions with breeding experts in central France.

**Context:** this study will be integrated and coordinated in a large on-going project. The evaluation will use the scenarios and data that will be designed for the software development of this project.

**Profile:** Master II student, with a taste for both mathematics and programming. Speaking might involve English, Coding might be in C++, and development environment is Linux. Optimization tool will be [CPLEX](#) and [ODME](#). Initiative and autonomy are greatly appreciated.

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