Application for an ESF Short Visit Grant

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A. Research project and aim of the visit

Frobenius Manifolds in Singularity Theory

Frobenius manifolds are, roughly speaking, manifolds with a product on the tangent sheaf, a compatible flat metric and an Euler vector field. The first element, in addition to a certain integrability condition, gives rise to a generalization of Frobenius manifold, called F-manifold, in which no metric is involved.
Frobenius manifolds arise in many seemingly different areas of mathematics; two of the main sources for such objects are definitely unfoldings of singularities and quantum cohomology. In the first case the multiplication is naturally related to some kind of Kodaira-Spencer map, while in the second case one has to deal with the calculation of Gromov-Witten invariants. Among the many implications of mirror symmetry conjectures, there should be isomorphisms between Frobenius manifolds of the two families, providing interesting connections between the two teories involved.
My research project deals with the study of singular functions over singular complete intersections and space curves. The construction of Frobenius structures in the base space of versal deformations of such singularities would have an important impact in many directions, such as for example integrable systems and Coxeter groups, besides of course singularity theory, Frobenius manifolds, quantum cohomology and mirror symmetry themselves. For these singular objects the structure of F-manifold has recently been constructed. A deep understanding of Gromov-Witten invariants techniques is very important to approach the mirror side of the story.
For this reason I would apply for an ESF Short Visit Grant to attend lectures dealing with these topics in the First Thematic Period in Algebraic Geometry and Topological Strings, that will take place in Lisbon from October 10, 2005.