# Titles and Abstracts

## Minicourses

### Emily Clader (San Francisco): Introduction to Gromov-Witten-theory

### Felix Janda (Michigan): Tautological rings and the double ramification cycle

### Georg Oberdieck (Bonn): Modular forms in enumerative geometry

## Reserach talks

### Kathrin Bringmann (Köln): False theta functions and their modular properties.

In my talk I will discuss modular properties of false theta functions. Due to a wrong sign factor these are not directly seen to be modular, however there are ways to repair this. I will report about this in my talk.

### Emily Clader (San Francisco): Wall-crossing in quasimap theory

Quasimaps are a generalization of stable maps that depend on the additional datum of a positive rational number epsilon. The dependence of the theory on epsilon is encoded in certain wall-crossing formulas, first conjectured by Ciocan-Fontanine and Kim and since proved in many cases, which are intimately related to the subject of mirror symmetry. I will discuss quasimap theory and describe an alternative proof of Ciocan-Fontanine–Kim's wall-crossing theorem for all-genus quasimaps to complete intersections in projective space; this proof has the advantage that it can be adapted to prove an analogous theorem in the more general context of certain "gauged linear sigma models." This is joint work with Felix Janda and Yongbin Ruan.

### Felix Janda (Michigan): Variants of the DR cycle

In this talk I want to discuss two variants of the double ramification cycle. One is a DR cycle twisted over a base manifold X. The other is a DR cycle twisted by a power of the dualizing sheaf, and is closely related to strata of meromorphic differentials. This is based on work joint with R. Pandharipande, A. Pixton and D. Zvonkine.

### Martijn Kool (Utrecht): New calculations in Vafa-Witten theory

In the 1990's, Vafa-Witten tested S-duality of $N = 4$ supersymmetric Yang-Mills theory on a complex algebraic surface by studying modularity of a certain partition function. Recently, a mathematical definition of Vafa-Witten's invariants was given by Tanaka-Thomas. I outline a method for calculating the instanton contribution to these invariants using Mochizuki's

theory of algebraic Donaldson invariants. For $SU(2)$, this leads to verifications of Vafa-Witten's original formula. For $SU(3)$, we find a new formula which corrects an error in the physics literature. I will also discuss refinements to virtual $\chi_y$ genus, elliptic genus, and cobordism class.

### Hyenho Lho (Zürich): Quasi-modularity of Calabi-Yau fibration

Quasi-modularity and holomorphic anomaly equations were conjectured for Gromov-Witten invariants of elliptic fibrations by Oberdieck and Pixton. I will discuss the generalisation of this conjectures to higher dimensional Calabi-Yau fibrations and prove some partial results of the conjectures for Calabi-Yau manifolds given by hypersurface in some toric varieties.

### Cristina Manolache (Imperial): An introduction to virtual classes

In order to define intersection theory on spaces with several components of different dimensions one needs to define a "virtual class". I will explain the construction of the virtual class in a number of examples and I will state some properties.

### Cristina Manolache (Imperial): A splitting of the virtual class

One of the main computational tools in genus zero Gromov–Witten theory is Quantum Lefschetz. Quantum Lefschetz fails for higher genus invariants. I will show how to split the virtual class of the moduli space of genus one stable maps and discuss applications of this splitting. This is based on joint work with Tom Coates.

### Georg Oberdieck (Bonn): The Gromov-Witten theory of $T^*\mathrm{Ex}\mathbb{P}^1$

I will explain how to compute the Gromov-Witten theory of the product of the cotangent bundle of an elliptic curve with the projective line, relative to fibers over the $\mathbb{P}^1$. The answer is expressed in terms of an operator on Fock space and quasi-Jacobi forms. Joint work with A. Pixton.

### Nicola Pagani (Liverpool): Towards an enumerative geometry of compactified universal Jacobians

We will discuss some results on enumerative geometry calculations on compactified universal Jacobians, and their relation to the well-studied enumerative geometry of $\overline{\mathcal{M}}_{g,n}$, the moduli space of stable pointed curves. The main new phenomenon (compared to $\overline{\mathcal{M}}_{g,n}$) is that the compactification of the Jacobian depends on a polarization parameter, so the challenge is to produce wall-crossing formulae. Most results are obtained in collaboration with Jesse Kass (University of South Carolina).

### Adrian Sauvaget (Jussieu): Masur-Veech volume recursion

We will present a recursion for Masur-Veech volumes. One of the important step in the proof of this formula is to show that the connected q-bracket from the algebra of shifted symmetric function can partially be computed inductively.

**Dmitry Zvonkine (Jussieu): Cohomological field theories with non-tautological classes**

We construct the first known example of a cohomological field theory that takes values not only in the tautological cohomology ring of the moduli space, but also in the non-tautological part. This is a joint work with Rahul Pandharipande.