# Gauged Sigma-Models in Two Dimensions Workshop Talk Schedule

**Events for: Monday, November 3rd - Friday, November 7th** 

Monday, November 3rd

8:30am Breakfast

9:30am Registration

10:45am Welcome

11:00am Nikita Nekrasov - SCGP 102

Title: "Bethe wavefunctions from gauged linear sigma models via Bethe/gauge correspondence".

**Abstract:** Bethe wavefunctions for the Heisenberg spin chain and elliptic Calogero-Moser manybody system will be computed using gauged linear sigma models.

12:00pm **Lunch** 

#### 2:00pm Jaume Gomis - SCGP 102

**Title:** "Microscopic GLSM Description of M2-brane Surface Operators and Sphere Partition Functions"

# 3:00pm Meng-Chwan Tan - SCGP 102

Title: A quasi-topological gauged sigma model, the geometric Langlands program, and knots

4:00pm Tea

4:45pm Oscar Garcia-Prada - SCGP 102

# Tuesday, November 4th

#### 8:30am Breakfast

#### 9:30am Ignasi Mundet i Riera - SCGP 102

Title: Nonlinear vortices on nearly nodal curves

**Abstract:** We consider nonlinear vortices (aka gauged pseudoholomorphic maps) with target a compact symplectic manifold endowed with a Hamiltonian action of the circle. In joint work with Gang Tian we proved a compactness theorem for nonlinear vortices of bounded energy in which the conformal structure of the domain Riemann surface is allowed to vary along the moduli space of stable nodal (marked) curves. The main issue of the theorem is a description of the possible objects and phenomena that may arise when a node appears in the limit of the Riemann surfaces: these include meromorphic connections and gradient segments of the moment map. In this talk we will explain how to understand these phenomena when the nonlinear vortices arise from algebraic objects via the Hitchin-Kobayashi correspondence. This will be applied to exhibit concrete sequences of nonlinear vortices of algebraic origin whose limit includes gradient flow lines or meromorphic connections (this last section will be based on joint work with Guangbo Xu).

# 10:30am Coffee

#### 11:00am Martin Speight - SCGP 102

**Title:** The L^2 geometry of the space of P^1 vortex-antivortex pairs.

#### 11:30am AST-105 - SCGP 103

#### 12:00pm Lunch

# 1:00pm SCGP Weekly Talk: Ignasi Mundet i Riera (University of Barcelona), "Vortex equations and invariants: A survey" - SCGP 102

Title: "Vortex equations and invariants: a survey"

2:00pm Marcel Bökstedt - SCGP 102

Title: Divisor links

#### 3:00pm Christian Wegner - SCGP 102

Title: L^2-Betti numbers and particle counting in a gauged nonlinear sigma-model

#### 4:00pm Tea

#### 4:45pm Guangbo Xu - SCGP 102

Title: Gauged Witten equation and correlation function

**Abstract:** This is a joint work with Gang Tian. I will talk about the analytical properties of the classical equation of motion in gauged linear \$\sigma\$-model, which we call the gauged Witten equation. This is a generalization of the Witten equation in Landau-Ginzburg A-model (Fan-Jarvis-Ruan, Witten) and the symplectic vortex equation (Mundet, Cieliebak-Gaio-Salamon). We will also discuss a mathematical definition of the correlation function, using the moduli space of gauged Witten equation, when the curve is fixed.

# Wednesday, November 5th

8:30am Breakfast

#### 9:30am Anton Kapustin - SCGP 102

Title: TBA

10:30am Coffee

#### 11:00am Eric Sharpe - SCGP 102

**Title:** Recent developments in 2d (0,2) theories

12:00pm Lunch

#### 2:00pm Hold for Nikita's Student Seminars - SCGP-313

2:00pm Abhijit Gadde - SCGP 102

Title: Exact solutions of 2d supersymmetric gauge theories

**Abstract:** We study dynamics of two-dimensional non-abelian gauge theories with N=(0,2) supersymmetry that include N=(0,2) supersymmetric QCD and its generalizations. For a range of parameters where supersymmetry is not dynamically broken at low energies, we give a complete description of the low-energy physics in terms of 2d N=(0,2) SCFTs using anomaly matching and modular invariance.

# 3:00pm Amihay Hanany - SCGP 102

Title: TBA

4:00pm Tea

# 5:30pm Art and the Quantum Moment Pre-Exhibition Talk by Arthur I Miller - Lobby, 103

Title: "Colliding Worlds: How Cutting-Edge Science is Redefining Contemporary Art"

**Abstract:** There is a quiet revolution going on in the world of art, a new avant garde pushing the boundaries farther than ever before. These are artists who work together with scientists to make extraordinary creations that may well change the world as we know it. From designer butterflies to plastic surgery as performance theatre, from rabbits that glow in the dark to seeing sound and sculpting data – in my talk I will introduce this brave new world. What are some of the many sorts of art that spring from the interplay between art and science? How did this interaction begin and where is it going in the 21st century? How are concepts such as art and aesthetics being redefined? Are there similarities between the creative processes of artists and scientists and if so, what? These are some of the questions I will explore while looking into the exciting new art movement which I call artsci.

# Thursday, November 6th

8:30am Breakfast

# 9:30am Dave Morrison - SCGP 102

Title: Mirror symmetry and gauged linear sigma models

10:30am Coffee

11:00am Chris Woodward - SCGP 102

**Title:** Flipping out over vortices?

# 11:30am AST-105 - SCGP 103

# 12:00pm Lunch

### 2:00pm Kentaro Hori - SCGP 102

**Title:** Grade restriction rule for Rodland model and Pfaffian/Grassmann correspondence, via hemisphere partition function

**Abstract:** The talk is about D-branes in "Rodland model", a gauged linear sigma model with two geometric phases --- Pfaffian phase and Grassmannian phase, as well as in another model ("Hosono-Takagi model") with the similar feature. The "grade restriction rule" for each window between the two phases is presented. This yields the rule of D-brane transport through the windows and in particular the monodromy around the singular points. The hemisphere partition function is used to find the rule. Based on a joint work with Richard Eager, Johanna Knapp and Mauricio Romo.

### 3:00pm Francesco Benini - SCGP 102

**Title:** Cluster algebras from 2d gauge theories

**Abstract:** In the first part of the talk we study some dualities of two-dimensional supersymmetric N=(2,2) gauge theories, reminiscent of 4d Seiberg duality, focusing on chiral and twisted chiral rings and the so-called sphere partition function. In the second part we observe that, when applied to quiver gauge theories, those dualities realize the cluster algebras of Fomin and Zelevinsky in their full completeness, with consequences in physics and mathematics.

4:00pm Tea

# 6:00pm Workshop Banquet

Friday, November 7th

8:30am Breakfast

9:30am Tudor Dimofte

Title: 3d N=4 Gauge Theory and Symplectic Duality

**Abstract:** I will discuss half-BPS boundary conditions for 3d N=4 theories, and their IR realizations on the Higgs and Coulomb branches. After putting the 3d theory in an Omega background, boundary conditions map to objects in a certain D-module like category, which is a generalization of the Bernstein-Gelfand-Gelfand "Category O." Moving from the Higgs to the Coulomb branch, either by passing through the UV gauge theory or by acting with 3d mirror symmetry, induces a duality between two different "Categories O," and gives a new perspective on what is known mathematically as symplectic duality.

# 10:30am Coffee

# 11:00am Lotte Hollands

Title: "Superconformal index and surface defects"

# 12:00pm Lunch

#### 2:00pm Piotr Sulkowski

Title: BPS states, knots and vortices

# 3:00pm Du Pei - SCGP 102

Title: Equivariant integration over Hitchin moduli space

4:00pm Tea