

# Aspects of Supergravity Workshop Talk Schedule

Events for:  
**Monday, January 6th - Friday, January 10th**

<b>Monday, January 6th</b>
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9:00am **Breakfast/Registration - SCGP Cafe/Lobby**

10:00am **Dan Freedman - SCGP 102**

**Title:** In heaven there is no beer; that's why we drink it here!

**Abstract:** TBA

10:45am **Coffee Break - SCGP Cafe**

11:00am **Riccardo D'Auria - SCGP 102**

**Title:** Rotating Black Holes and Duality

**Abstract:** TBA

11:45am **Break**

12:00pm **Gustav Delius - SCGP 102**

**Title:** QFT approach to a sustainable fisheries policy

**Abstract:** This is a talk not about aspects of supergravity but about the surprising fact that when a student of Peter van Nieuwenhuizen moves to a practical field as far removed from supergravity as imaginable, like fisheries management, he finds that Peter's influence continues to be useful. The purpose of the talk is to encourage further exploration of applications of field theory techniques outside the traditional areas of quantum theory and statistical mechanics. Current fisheries policy is based on selectively harvesting large individuals and protecting juveniles. Evidence is accumulating that selective harvesting can destabilize ecosystem dynamics, and has led to evolutionary change in fish. I was asked by the ecologist Richard Law to help develop an understanding of the problem by modelling the dynamics of the fish size spectrum. Using particle physics thinking allowed us to build and analyse a model that keeps track of the biomass moving up the food chain. This gives a new perspective on fisheries management supporting balanced rather than selective harvesting as a means of reducing the disruption of the natural size spectrum, improving ecosystem resilience and, strikingly, substantially increasing biomass yield. In the talk I will explain how familiar quantum field theory concepts like second quantization, coherent states, path integrals and scale invariance provide powerful tools for studying the dynamics of fish populations, even though fish care neither about quantum theory nor about relativity.

12:45pm **Lunch - SCGP Cafe**

2:00pm **Anna Ceresole - SCGP 102**

**Title:** Applied Supergravity

**Abstract:** TBA

2:45pm **Fiorenzo Bastianelli - SCGP 102**

**Title:** Worldline approach to higher spin fields on (A)dS

**Abstract:** I describe a first-quantized approach to a class of higher spin fields which makes use of spinning particle actions with local extended supersymmetry on their worldline. I discuss how this description gives rise to the Fronsdal-Labastida field equations in flat space, how one can couple the higher spinning particles to conformally flat spacetimes, and how to obtain a worldline representation of the one-loop effective action on (A)dS spaces.

3:30pm **Tea Time - SCGP Cafe**

4:00pm **Eric Bergshoeff - SCGP 102**

**Title:** The Branes of Supergravity

**Abstract:** I show how recent results in supergravity can be used to classify the half-supersymmetric branes of (toroidally compactified) string theory. It follows that many of the branes in lower dimensions follow from the ten-dimensional ones by imposing specific so-called 'wrapping rules'. I discuss the relation with the central charges in the supersymmetry algebra and speculate how all these results are related to recent investigations on the geometry underlying string theory.

<b>Tuesday, January 7th</b>
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9:00am **Breakfast - SCGP Cafe**

10:00am **Kazuo Fujikawa - SCGP 102**

**Title:** Lorentz invariant CPT violation and particle-antiparticle mass splitting

**Abstract:** TBA

10:45am **Coffee Break - SCGP Cafe**

11:00am **Hermann Nicolai - SCGP 102**

**Title:** Tensor Hierarchies from D=11 Supergravity

**Abstract:** TBA

11:45am **Break**

12:00pm **Bernard Julia - SCGP 102**

**Title:** From strings to maximal supergravity and back with more surprises to come

**Abstract:** TBA

12:45pm **Lunch - SCGP Cafe**

2:00pm **Jan de Boer - SCGP 102**

**Title:** Entropy in higher spin theories

**Abstract:** TBA

2:45pm **Krzysztof Pilch - SCGP 102**

**Title:** Supersymmetric Janus solutions in maximal supergravities

**Abstract:** TBA

3:30pm **Tea Time - SCGP Cafe**

4:00pm **Bernard de Wit - SCGP 102**

**Title:** Off-shell dimensional reduction

**Abstract:** TBA

**Wednesday, January 8th**

9:00am **Breakfast - SCGP Cafe**

10:00am **Nathan Berkovits - SCGP 102**

**Title:** Covariant Map between RNS and Pure Spinor Superstring Formalisms

**Abstract:** A covariant map is found which relates the RNS and Pure Spinor BRST operators and vertex operators. Ramond vertex operators do not require spin fields and Ramond-Ramond backgrounds can be constructed. An argument is sketched for relating the amplitude prescriptions in the two superstring formalisms.

10:45am **Coffee Break - SCGP Cafe**

11:00am **Pietro Grassi - SCGP 102**

**Title:** Integral Forms: from Superstrings to Supergravity

**Abstract:** TBA

11:45am **Break**

12:00pm **Stefan Vandoren - SCGP 102**

**Title:** Black holes in gauged supergravity and supersymmetry breaking

**Abstract:** TBA

12:45pm **Lunch - SCGP Cafe**

2:00pm **Paul Townsend - SCGP 102**

**Title:** Status of massive 3D gravity

**Abstract:** In three spacetime dimensions there is a simple construction that converts the free massive spin-2 theory of Fierz and Pauli into an interacting, theory that is both unitary and generally covariant; the result is "new massive gravity" (NMG). However, in an  $adS$  background the central charge of a putative dual CFT is negative in the semi-classical limit. This problem, which is shared by other 3D massive gravity models such as "topologically massive gravity" (TMG), is solved by "zwei dreibein gravity" (ZDG), which is perturbatively equivalent to "new massive gravity", has no other degrees of freedom in any background, and is such that a dual CFT will have a positive central charge in the semi-classical limit. --> This talk will review the construction that leads to NMG (and to TMG), explain the "bulk vs boundary" unitarity problem, and how this is solved by ZDG.

2:45pm **Koenraad Schalm - SCGP 102**

**Title:** Anti-de Sitter space, Kaluza-Klein Theory and Condensed Matter

**Abstract:** TBA

3:30pm **Tea Time - SCGP Cafe**

4:00pm **Robert Wimmer - SCGP 102**

**Title:** Anomalies and central charges in  $N=2$  theories

**Abstract:** TBA

**Thursday, January 9th**

9:00am **Breakfast - SCGP Cafe**

10:00am **Sergio Ferrara - SCGP 102**

**Title:** R+R2 theory of Supergravity and inflaton potential

**Abstract:** TBA

10:45am **Coffee Break - SCGP Cafe**

11:00am **Ergin Sezgin - SCGP 102**

**Title:** Higher Spin Gauged Supergravity Theories

**Abstract:** TBA

11:45am **Break**

12:00pm **Alberto Lerda - SCGP 102**

**Title:** Non-perturbative aspects of the gauge/gravity correspondence

**Abstract:** TBA

12:45pm **Lunch - SCGP Cafe**

2:00pm **Horatiu Nastase - SCGP 102**

**Title:** Understanding AdS/CMT: LG and vortices from ABJM/AdS<sub>4</sub>×CP<sup>3</sup>

**Abstract:** TBA

2:45pm **Niels Nielsen - SCGP 102**

**Title:** Higgs boson decay into two photons in a strong magnetic field

**Abstract:** See abstract in chart schedule on workshop website:  
<http://scgp.stonybrook.edu/archives/7141>

3:30pm **Tea Time - SCGP Cafe**

4:00pm **Mark Fischler - SCGP 102**

**Title:** Aspects of the Early Days of Supergravity

**Abstract:** The early days of Supergravity, from the construction of the theory by van Nieuwenhuizen, Freedman and Ferrara through the development of extended Supergravity theories, were an exciting time for theoretical physics and particularly for the ITP at Stonybrook. I will present an anecdotal history of that period, and some insights and stories about Peter van Nieuwenhuizen himself, from the viewpoint of PVN's first thesis student.

5:00pm **Wine and Cheese Reception for Della Pietra Lecture - SCGP Lobby**

5:30pm **Della Pietra Lecture: Martinus Veltman, "The Higgs particle" - SCGP 103**

**Speaker:** Martinus Veltman

**Title:** "The Higgs particle"

7:00pm **Banquet - SCGP Cafe**

**Friday, January 10th**

9:00am **Breakfast - SCGP Cafe**

10:00am **Kostas Skenderis - SCGP 102**

**Title:** Conformal field theory in momentum space

**Abstract:** TBA

10:45am **Coffee Break - SCGP Cafe**

11:00am **Anton Rebhan - SCGP 102**

**Title:** Surprising Aspects of Quark-Gluon-Plasma due to Supergravity

**Abstract:** TBA

11:45am **Break**

12:00pm **Andrew Waldron - SCGP 102**

**Title:** Einstein's Fugu

**Abstract:** Einstein's equations can be reformulated in the language of conformal geometry which gives a simple characterization of how physical wave equations couple to scale and, in turn, uncovers a simple and general solution generating algebra. This allows the computation of formal solutions of wave equations in generally curved spaces with data along conformal infinities and anomalies associated with the failure of these to be smooth.

12:45pm **Lunch - SCGP Cafe**

2:00pm **Diana Vaman - SCGP 102**

**Title:** Jets in strongly coupled plasmas

**Abstract:** TBA

2:45pm **Alexander Sevrin - SCGP 102**

**Title:** A Walk on the Supersymmetric Worldsheet

**Abstract:** TBA

3:30pm **Tea Time - SCGP Cafe**

4:00pm **Jim Gates - SCGP 102**

**Title:** Following SUSY Representation Theory from Adinkra Graphs to Riemann Surfaces

**Abstract:** In this presentation, there will be given a review on the developments that tie the off-shell representation theory of SUSY to super Riemann surfaces.