

**SCHEDULE AND ABSTRACTS OF TALKS PRESENTED AT  
THE 2<sup>nd</sup> ANNUAL IPFW ANALYSIS MINI-SYMPOSIUM**

The 2<sup>nd</sup> Annual IPFW Analysis Mini-Symposium is Friday, November 9, 2012.

SPONSORED BY

- IPFW Department of Mathematical Sciences
- IPFW Office of Research, Engagement, and Sponsored Programs.

FRIDAY SCHEDULE

(Last update Friday Nov. 2 — subject to change...)

All talks in Kettler 218.

- Coffee starting before 9:00 in Tea Room, Kettler 200
- 9:00–9:50 N. Levenberg
- 10:00–10:50 S. Borodachov
- 11:00–11:50 Y. Yan
- Lunch Break
- 1:30–2:20 Y. Zhang
- Tea Break, Kettler 200
- 3:30–4:20 Y. Pan
- Dinner off-campus

ABSTRACTS OF TALKS

**Presenter:** Sergiy Borodachov, Towson University

*Asymptotics for the discrete minimum Riesz energy problem*

We will consider the problem of minimizing the energy of  $N$  repelling points on a given compact set in the  $m$ -dimensional Euclidean space that interact via an inverse power law potential. After briefly discussing known results for certain values of  $N$  on the sphere, our focus will be on the behavior of the main term of the minimum energy as  $N$  gets large, as well as the limiting behavior of optimal configurations on more general manifolds. We consider the case of short range interactions when the power of the potential is greater than or equal to the dimension of the manifold. In this case potential-theoretic methods cannot be applied and we use results and techniques from Geometric Measure Theory.

We will also discuss some variations of this problem such as the weighted energy problem and the truncated energy problem when pairs of points which are “too far” from each other are removed from the energy sum. Applications of these problems to discretization of manifolds will be discussed as well.

**Presenter:** Norm Levenberg, Indiana University Bloomington

**Joint work with:** John Anderson, Joe Cima, and Tom Ransford

*Projective hulls and characterizations of meromorphic functions*

We give conditions characterizing holomorphic and meromorphic functions in the unit disk of the complex plane in terms of certain weak forms of the maximum principle. Our work is directly inspired by recent results of John Wermer, and by the theory of the projective hull of a compact subset of complex projective space developed by Reese Harvey and Blaine Lawson.

**Presenter:** Yifei Pan, IPFW

*Finding flat solutions of the Cauchy-Riemann equation with flat data*

In an attempt to prove equivalence of two unique continuation problems for Laplace and  $\bar{\partial}$  in the complex plane, I am led to study to how to find flat solutions of the Cauchy-Riemann equation for flat data. As a result, I prove a sufficient and necessary condition for existence. An open question is to prove (or disprove) that such a condition is met for any flat function, which would solve the equivalence problem.

**Presenter:** Yu Yan, Huntington University

**Joint work with:** Yifei Pan and Mei Wang

*A Hopf lemma for higher order differential inequalities and its applications*

Hopf's Lemma is one of the fundamental tools in the study of second order elliptic partial differential equations. Although it has been studied extensively, there appears to be no work in the literature on the Hopf Lemma for third or higher order equations. In this talk we will present a higher order Hopf lemma in one variable and discuss some of the applications.

**Presenter:** Yuan Zhang, IPFW

**Joint work with:** John Erik Fornæss and Lina Lee

*Sup-norm estimates for  $\bar{\partial}$  on infinite type convex domains in  $\mathbb{C}^2$*

In this talk, we study the  $\bar{\partial}$  equation on some smooth convex domains of infinite type in  $\mathbb{C}^2$ . In detail, we show that supnorm estimates hold for those infinite exponential type domains provided the exponent is less than 1.