# Banff International Research Station 

## for Mathematical Innovation and Discovery

# Analytic Tools in Computational Complexity August 3-8, 2008 

MEALS

*Breakfast (Buffet): 7:00-9:30 am, Sally Borden Building, Monday-Friday
*Lunch (Buffet): 11:30 am-1:30 pm, Sally Borden Building, Monday-Friday
*Dinner (Buffet): 5:30-7:30 pm, Sally Borden Building, Sunday-Thursday
Coffee Breaks: As per daily schedule, 2nd floor lounge, Corbett Hall
*Please remember to scan your meal card at the host/hostess station in the dining room for each meal.

## MEETING ROOMS

All lectures will be held in Max Bell 159 (Max Bell Building accessible by walkway on 2nd floor of Corbett Hall). LCD projector, overhead projectors and blackboards are available for presentations. Please note that the meeting space designated for BIRS is the lower level of Max Bell, Rooms 155-159. Please respect that all other space has been contracted to other Banff Centre guests, including any Food and Beverage in those areas.

## SCHEDULE

|  | Sunday |
| :---: | :---: |
| $\begin{aligned} & \text { 16:00 } \\ & \text { 17:30-19:30 } \end{aligned}$ | Check-in begins (Front Desk - Professional Development Centre - open 24 hours) |
|  | Buffet Dinner, Sally Borden Building |
|  | Monday |
| 7:00-8:45 | Breakfast |
| 8:45-9:00 | Introduction and Welcome to BIRS by BIRS Station Manager, Max Bell 159 |
| 9:00-9:50 | S. Khot: Inapproximability of NP-complete problems, discrete Fourier analysis, and geometry |
| 9:55-10:45 | D. Moshkovitz: 2-query PCP with subconstant error |
| 10:45-11:00 | Coffee Break |
| 11:00-11:50 | R. Raz: A counterexample to Strong Parallel Repetition |
| 11:50-13:00 | Lunch |
| 13:00-13:30 | A. Rao: Rounding parallel repetitions of unique games |
| 13:35-14:05 | R. O'Donnell: Zwick's conjecture is implied by most of Khot's conjectures |
| 14:05 | Group Photo; meet on the front steps of Corbett Hall |
| 17:30-19:30 | Dinner |
| 20:00-22:00 | A. Sherstov: Tutorial on sign-rank |

## Tuesday

| 7:00-9:00 | Breakfast |
| :---: | :---: |
| 9:00-9:50 | A. Sherstov: The sign-rank of $A C^{0}$ |
| 9:55-10:45 | P. Beame: Communication complexity of $A C^{0}$ |
| 10:45-11:00 | Coffee Break |
| 11:00-11:50 | G. Kindler: Can cubic tiles be sphere-like? |
| 11:50-13:00 | Lunch |
| 13:00-13:30 | S. Aaronson: How to solve longstanding open problems in quantum computing using only Fourier analysis |
| 13:35-14:05 | M. Sudan: Towards universal semantic communication |
| 14:05-14:30 | Coffee Break |
| 17:30-19:30 | Dinner |
|  | Wednesday |
| 7:00-9:00 | Breakfast |
| 9:00-9:50 | Z. Dvir: The finite field Kakeya conjecture and applications to the construction of mergers and extractors |
| 9:55-10:45 | S. Lovett: Worst-case to average-case reductions for polynomials |
| 10:45-11:00 | Coffee Break |
| 11:00-11:50 | E. Viola: Hardness amplification requires Majority |
| 11:50-13:00 | Lunch |
| 13:00-13:30 | O. Regev: Unique games with entangled provers are easy |
| 13:35-14:05 | C. Umans: Fast modular composition in any characteristic |
| 14:05-14:30 | Coffee Break |
| 17:30-19:30 | Dinner |
| 20:00-22:00 | A. Wigderson: The power of partial derivatives |

## Thursday

| 7:00-9:00 | BREAKFAST |
| :--- | :--- |
| 9:00-9:50 | D. Zuckerman: List-decoding Reed-Muller codes over small fields |
| $\mathbf{9 : 5 5 - 1 0 : 4 5}$ | R. Jaiswal: Uniform Direct Product theorems |
| 10:45-11:00 | COFFEE BREAK |
| 11:00-11:50 | R. Shaltiel: Unconditional weak derandomization of weak algorithms: |
|  | Explicit versions of Yao's lemma |
| 11:50-13:00 | LuNCH |
| 13:00-13:30 | B. Barak: Public-key cryptography from different assumptions |
| 13:35-14:05 | R. Servedio: Testing Fourier dimensionality and sparsity |
| 14:05-14:30 | COFFEE BREAK |
| $\mathbf{1 7 : 3 0 - 1 9 : 3 0}$ | DINNER |

## Friday

| 7:00-9:00 | BREAKFAST |
| :--- | :--- |
| $\mathbf{9 : 0 0 - 9 : 5 0}$ | A. Klivans: Agnostically learning decision trees |
| $\mathbf{9 : 5 5 - 1 0 : 2 5}$ | S. Vadhan: Why simple hash functions work: Exploiting the entropy in a data stream |
| $\mathbf{1 0 : 2 5 - 1 0 : 4 0}$ | COFFEE BREAK |
| $\mathbf{1 0 : 4 0 - 1 1 : 3 0}$ | M. Szegedy: Long codes and the Dichotomy Conjecture for CSPs |
| $\mathbf{1 1 : 3 5 - 1 2 : 0 5}$ | M. Braverman: The complexity of simulating Brownian motion |
| $\mathbf{1 2 : 0 5 - 1 3 : 3 0}$ | LUNCH |

Checkout by 12 noon. ${ }^{* *}$ 5-day workshops are welcome to use the BIRS facilities (2nd Floor Lounge, Max Bell Meeting Rooms, Reading Room) until 3 pm on Friday, although participants are still required to checkout of the guest rooms by 12 noon. **

