# Weizmann Workshop 2013 on Multilevel computational methods and optimization
## The David Lopatie Conference Centre
## 29 April -02 May 2013

| April 29 | |
|---|---|
| 18:00-21:00 | Wine and Cheese Informal Reception + Registration<br>**The reception will take place in Cafe' Mada at David Lopatie Conference Centre** |

| April 30 | | | |
|---|---|---|---|
| 09:00-09:25 | Registration + Coffee | | |
| 09:25-09:30 | Opening remarks by the organizers | | |
| 09:30:10:00 | Ulrich Trottenberg: "The Multigrid Guide" | | |
| 10:00-11:00 | Sessions | **1A** | **1B** |
| Sessions 1A, 1B | | *Graphs and Circuits 1* | *Computational Fluid Dynamics 1* |
| | Chairs | Jinchao Xu | Boris Diskin |
| | 10:00-10:30 | Tony Chan: Multilevel analytical circuit placement | Eli Turkel: Fast iterative methods for the Navier-Stokes equations |
| | 10:30-11:00 | Domenico Lahaye: Fast solvers for emerging power systems | Barry Koren: Multigrid for Reynolds-Averaged Navier-Stokes |
| 11:00-11:30 | Coffee Break | | |
| 11:30-12:30 | Sessions | **2A** | **2B** |
| Sessions 2A, 2B | | *Graphs and Circuits 2* | *Computational Fluid Dynamics 2* |
| | Chairs | Ronen Basri | Barry Koren |
| | 11:30-12:00 | Ludmil Zikatanov: Commuting projections on graphs and two-level methods | David Sidilkover: Algebraic multigrid and transonic flow |
| | 12:00-12:30 | Boaz Nadler: Multiscale vs. global approaches to learning from graphs and high dimensional data | Boris Epstein: A multi-scale approach to analysis and optimization of practical aerodynamic configurations |
| 12:30-14:00 | Lunch Break | | |
| 14:00-15:30 | Sessions | **3A** | **3B** |
| Sessions 3A, 3B | | *Parallel Multigrid* | *Mechanics* |
| | Chairs | Hans Bungartz | Alfio Borzi |
| | 14:00-14:30 | Ulrich Ruede: Textbook parallel efficiency for multigrid | Kees Venner: Multigrid achievements in thin layer flow modeling of rolling bearings |
| | 14:30-15:00 | Ulrike Yang: Recent developments in parallel algebraic multigrid | Ton Lubrecht: Multilevel methods and solid mechanics |
| | 15:00-15:30 | Harald Koestler: Algorithm and software development for efficient multigrid methods on modern HPC systems | Amnon Meir: Towards multi-scale models for woven fabrics |
| 15:30-16:00 | Coffee Break | | |
| 16:00-17:30 | Sessions | **4A** | **4B** |
| Sessions 4A, 4B | | *Multigrid and Preconditioning* | *Multigrid Techniques* |
| | Chairs | Ulrike Yang | James Brannick |
| | 16:00-16:30 | Panayot Vassilevski: Spectral AMGe numerical upscaling and solver adaptivity | Carmen Rodrigo: Multigrid methods based on distributive smoothers for vector problems on semi-structured triangular grids |
| | 16:30-17:00 | Cornelis Oosterlee: An Uzawa smoother for staggered and nonstaggered Stokes discretizations | James Brannick: AMG for QCD |
| | 17:00-17:30 | Blanca Ayuso: A combined preconditioning strategy for nonsymmetric systems | Stefan Vandewalle: Multigrid for parametric partial differential equations, with application to PDEs with interval and fuzzy coefficients |
| 17:30-18:30 | Special Panel. "Challenges in Multilevel Computation: where should we be directing our efforts – and our graduate students?" | | |
| 19:30 | Conference Dinner (**for invited speakers and guests from abroad**) | | |

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| May 1 | | | |
|---|---|---|---|
| 09:00-09:30 | Coffee | | |
| 09:30-10:30 | Sessions | **5A** | **5B** |
| Sessions 5A, 5B | | *Algebraic Multigrid 1* | *Computational Fluid Dynamics 3* |
| | Chairs | Volker Schulz | Jacob Schroder |
| | 9:30-10:00 | Yvan Notay:  Aggregation-based AMG for non M-matrices | Boris Diskin: Adjoint-based optimization of unsteady turbulent flows on dynamic overset unstructured grids |
| | 10:00-10:30 | Hans de Sterck: Adaptive algebraic multigrid for canonical tensor decomposition | Long Chen: Multigrid methods for Stokes equations based on distributive Gauss-Seidel relaxation |
| 10:30-11:30 | Sessions | **6A** | **6B** |
| Sessions 6A, 6B | | *Optimal Control and Data Analysis* | *Sparse Grids and PDE* |
| | Chairs | Justin Wan | Ulrich Ruede |
| | 10:30-11:00 | Ronald Hoppe: Adaptive finite element methods for optimally controlled elliptic variational inequalities | Hans Bungartz: Sparse grids – exploiting hierarchy for higher dimensionalities |
| | 11:00-11:30 | Yoel Shkolnisky: A class of Laplacian multiwavelet bases for high-dimensional data | Alfio Borzi: Multigrid, sparse-grids, and model reduction for PDE optimization with uncertainty |
| 11:30-12:00 | Coffee Break | | |
| 12:00-13:00 | Achi Brandt: Multiscale computation: challenges and algorithms | | |
| 13:00 | Lunch | | |
| | Jerusalem Tour (**for invited speakers and guests from abroad**)) | | |

| May 2 | | | |
|---|---|---|---|
| 09:00-09:30 | Coffee | | |
| 09:30-11:00 | Sessions | **7A** | **7B** |
| Sessions 7A, 7B | | *Helmholtz and Optimization* | *Imaging* |
| | Chairs | Ralf Kornhuber | Johannes Kraus |
| | 9:30-10:00 | Zhiming Chen: A source transfer domain decomposition method for Helmholtz equations in unbounded domain | Xue-Cheng Tai: A nonlinear multigrid method for curvature equations related to total variation minimization |
| | 10:00-10:30 | Kees Vuik: Deflation type methods combined with shifted Laplace preconditioners for the Helmholtz equation | Meirav Galun: Multiscale detection of faint edges in noisy images |
| | 10:30-11:00 | Dorit Ron: Three decades of multilevel optimization strategies | Ronen Basri: Matching image content by enforcing global geometric consistency |
| 11:00-11:30 | Coffee Break | | |
| 11:30-12:30 | Sessions | **7C** | **7D** |
| Sessions 7C, 7D | | *From Theory to Practice to Industry* | *Optimization and Control* |
| | Chairs | Kees Oosterlee | Irad Yavneh |
| | 11:30-12:00 | Jinchao Xu: Discretizations and solvers for coupled PDE systems | Volker Schulz: Experiences with MGOPT on GPU |
| | 12:00-12:30 | Klaus Stueben: AMG – from Academia to Industry | Dirk Abbeloos: A half-space analysis framework for boundary control problems |
| 12:30-14:00 | Lunch Break | | |
| 14:00-15:00 | Sessions | **8A** | **8B** |
| Sessions 8A, 8B | | *Inverse Problems* | *Nonlinear & Interface* |
| | Chairs | Scott Maclachlan | Hans de Sterck |
| | 14:00-14:30 | Uri Ascher: Data completion and stochastic algorithms for PDE inversion problems with many measurements | Ralf Kornhuber: Nonsmooth Schur-Newton methods for vector-valued Cahn-Hilliard equations |
| | 14:30-15:00 | Eldad Haber: Solving inverse problems that are too large to be solved | Justin Wan: Multigrid methods for linear and nonlinear problems in finance |
| 15:00-15:30 | Coffee Break | | |
| 15:30-17:00 | Sessions | **9A** | **9B** |
| Sessions 9A, 9B | | *Algebraic Multigrid 2* | *Fourier Analysis* |
| | Chairs | Eldad Haber | Uri Ascher |
| | 15:30-16:00 | Johannes Kraus: Auxiliary space multigrid method based on additive Schur complement approximation | Scott Maclachlan: Predictive mode analysis of parabolic problems |
| | 16:00-16:30 | Raanan Fattal: A hybrid AMG/combinatorial preconditioning scheme | Matthias Bolten: Local Fourier analysis of block smoothers in multigrid |
| 16:30 | Concluding remarks | | |