

PROGRAM



International Conference on
**Complementarity, Duality,
and Global Optimization in
Science and Engineering**

August 15-17, 2005

The Inn at Virginia Tech and Skelton Conference Center
Blacksburg, Virginia, USA



VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

CDGO 2005

Sunday, August 14

4:00–6:00 pm Registration, Latham Foyer

Monday, August 15

7:00–8:00 am—Continental Breakfast and Registration, Latham Foyer

8:15–8:30 am—Welcome and Opening Address, Latham Ballroom C

8:30–9:20 am—**Plenary Lecture on Duality**, Chair: M. Thera, Latham Ballroom C

- G. Strang (Massachusetts Institute of Technology), “Dual Problems of Mechanics in L^1 and L^∞ .”

9:20–10:20 am—**Gil Strang’s Symposium**, Chair: S. Nash, Latham Ballroom C

- D. Gao (Virginia Tech), “Canonical Duality Theory: Connection Between Nonconvex Mechanics and Global Optimization.”
- R. Polyak (George Mason), “Primal-Dual Lagrange Multipliers Method in Constrained Optimization.”

10:20–10:30 am—**Tea/Coffee Break**, Latham Foyer

10:30 am–12:00 pm—**Gil Strang’s Symposium**, Chair: P. Pardalos, Latham Ballroom C

- M. Thera (University of Limoges – LACO), “Well-Positioned Convex Sets and Functions and Applications.”
- G. Auchmuty (National Science Foundation), “Dual Variational Principles for Eigenvalue Problems.”
- A. Philpott (University of Auckland), “Rowing to Barbados,” with G. Leyland.

12:00–1:30 pm—**Lunch**, Latham Ballroom B

1:30–2:15 pm—**Tutorial on Optimization**, Chair: H. Serali, Latham Ballroom C

- H. Tuy (Vietnam National University), “Monotonic Optimization: Theory and Application.”

2:30–4:00 pm—**Invited Lectures**

Session A: Gil Strang’s Symposium, Chair: F. Baginski, Latham Ballroom C

- D. Russell (Virginia Tech) “Homogenization in Volume Control of Linear Elastic Systems.”
- H. Yoshimura (Waseda University), “Dirac Structures, Variational Principles and Implicit Lagrangian Systems.”
- J. Zhou (Texas A&M University), “A Saddle Critical Point Application to Minimization Problems with Uncertainty.”

Session B: Invited Lectures, Chair: D. Vandenbussche, Duckpond

- C. Xu (Xian Jiaotong University), “A Continuation Algorithm for the Solution of Max-Cut Problems,” with F. Xu.

- M. Shillor (University of Oakland), “Quasistatic Evolution of Damage in an Elastic Body.”
- G. Crespi (University of Valle D’Aosta), “Convex Along Lines Positive Homogeneous Functions and Abstract Convexity,” with I. Ginchev, M. Rocca, and A. Rubinov.

4:00–4:15 pm—**Tea/Coffee Break**, Latham Foyer

4:15–5:45 pm—**Invited Symposia and Contributed Sessions**

Session A: Symposium on Primal-Dual Algorithms for Nonlinear Optimization and their Applications, Co-Chairs: R. Polyak and I. Griva, Latham Ballroom C

- R. Polyak (George Mason University), “Regularized Newton’s Method for Unconstrained Optimization.”
- H. Benson (Drexel University), “Penalty Methods in Interior-Point Algorithms.”
- D. Shanno (Rutgers University), “Constraint Relaxation and Nonlinear Programming.”
- I. Griva (George Mason University), “A Globally Convergent Primal-Dual Exterior-Point Method,” with R. Polyak.

Session B: Engineering Optimization, Chair: J. Smith, Duckpond

- M. Tawarmalani (Purdue University), “Allocating Objects in a Network of Caches: Social Welfare and Incentive Compatibility,” with P. De, K. Kannan, and C. Kumar.
- S. Lawphongpanich (University of Florida), “Discrete-Time Models for Dynamic Traffic Assignment with Periodic Planning Horizon,” with D. Hearn and A. Nahapetyan.
- A. Ghate (University of Michigan), “A Simplex Method for Infinite Linear Programs,” with R. Smith.
- N. Sahinidis (University of Illinois), “Global Optimization with Branch-and-Reduce,” with M. Tawarmalani.

Session C: Global Optimization and Duality, Chair: Y. Sergeyev, Drillfield

- O. Prokopyev (University of Florida), “On Fractional 0-1 Programming Problems with Related Applications.”
- J. Nie (University of California, Berkeley), “Global Optimization Methods for Polynomials via SOS Relaxation and Gradient Information.”
- A. Chinchuluun (University of Florida), “Optimality Conditions and Duality for Multiobjective Programming Problems with Generalized Convexity.”
- Y. Sui (Beijing University of Technology), “A Method Based on Dual-Quadratic Programming for Frame Structural Optimization with Large Scale,” with J. Du, Y. Guo, and B. Ye.

7:00–9:00 pm—**Conference Banquet**, Latham Ballroom A

Tuesday, August 16

7:00–8:00 am—**Continental Breakfast and Registration**,
Latham Foyer

8:30–9:20 am—**Plenary Lecture on Complementarity**,
Chair: S. Fang, Latham Ballroom C

- J. Pang (Rensselaer Polytechnic Institute), “Linear Complementarity Systems.”

9:20–10:20 am—**Invited Lectures**, Chair: L. Watson,
Latham Ballroom C

- S. Fang (North Carolina State University), “Progress on Developing Shape-Preserving Cubic L_1 Splines.”
- J. Judice (University of Coimbra), “The Eigenvalue Complementarity Problem,” with I. Ribeiro and H. Sherali.

10:20–10:30 am—**Tea/Coffee Break**, Latham Foyer

10:30 am–12:00 pm—**Invited Lectures**

Session A: Complementarity and Applications

Chair: J. Judice, Latham Ballroom C

- F. Al-Khayyal (Georgia Institute of Technology), “Monotonic and Bilinear Approaches to Complementarity Problems,” with H. Tuy.
- G. Isac (Royal Military College of Canada), “Nonlinear Complementarity Theory: Some New Results by Topological Methods.”
- S. Hou (Hong Kong Polytechnic University), “System of Vector Equilibrium Problems and Vector Variational Inequalities.”

Session B: Duality in Natural Systems

Chair: G. Auchmuty, Duckpond

- J. Zhang (University of Michigan), “Dual Differential Geometry Induced from Legendre-Fenchel Duality.”
- S. Karam (Coppin State University), “Duality Axioms in Micro/Macro Systems.”
- D. Gao (Virginia Tech), “Triality and Complementarity in Natural Systems.”

12:00–1:30 pm—**Lunch**, Latham Ballroom B

1:30–2:15 pm—**Tutorial on Complementarity**, Chair:
R. Mifflin, Latham Ballroom C

- M. Ferris (University of Wisconsin), “Complementarity Problems and Applications.”

2:30–4:00 pm—**Invited Lectures**

Session A: Computational Optimization

Chair: M. Shillor, Latham Ballroom C

- L. Watson (Virginia Tech), “Massively Parallel Global Parameter Estimation for Cell Cycle Models,” with K. Chen, J. He, T. Panning, J. Tyson, and J. Zwolak.
- R. Mifflin (Washington State University), “A Rapidly Convergent VU-Algorithm for General Convex Minimization,” with C. Sagastizabal.
- Y. Sergeyev (University of Calabria), “Global Search Based on Efficient Diagonal Partitions.”

Session B: Symposium on Stochastic Methods for Global Optimization

Chair: Z. Zabinsky, Duckpond

- W. Kohn (University of Washington), “Optimization of Algorithmic Parameters Using a Meta-Control Approach,” with V. Brayman and Z. Zabinsky.
- D. Bulger (Macquarie University), “Quantum Computational Methods in Global Optimization.”
- Z. Zabinsky (University of Washington), “Annealing Adaptive Search with Hit-and-Run Sampling Methods for Global Optimization,” with Y. Shen.
- I. de Farias (University at Buffalo), “Branch-and-Cut for MPEC” with M. Zhao.

4:00–4:15 pm—**Tea/Coffee Break**, Latham Foyer

4:15–5:45 pm—**Invited Symposia and Parallel Sessions**

Session A: Complementarity and Variational Inequality

Chair: F. Al-Khayyal, Latham Ballroom C

- B. Ozcamlar (North Carolina State University), “A Discretization Based Smoothing Method for Solving Semi-Infinite Variational Inequalities,” with H. Cheng and S. Fang.
- U. Schaefer (University of Karlsruhe), “On Computer-Assisted Proofs for Solutions of Linear Complementarity Problems.”
- X. Yuan (University of Victoria), “A Prediction-Correction Approach to Nonlinear Complementarity Problems.”
- R. Mookherjee (Pennsylvania State University), “Stochastic Differential Variational Inequality Control Problems and their Application,” with T. Friesz.

Session B: Nonconvex Systems and Engineering Applications

Chair: D. Russell, Duckpond

- Z. Feng (University of Texas-Pan American), “A Dissipative Nonlinear System.”
- F. Botelho (University Federal de Pelotas), “A Dual Variational Formulation for a Non-linear Model of Plates,” with A. de Oliveira.
- Y. Wang (North Carolina State University), “Cubic L_1 Spline on Triangulated Network,” with S. Fang and W. Zhang.
- H. Yu (Virginia Tech), “Primal-Dual Method for Solving Nonconvex Rank-One Quadratic Minimization Problem,” with D. Gao.

Session C: Branch-and-Cut in Global Optimization

Chair: M. Tawarmalani, Drillfield

- D. Vandenbussche (University of Illinois), “Global Optimization of Quadratic Programs with Fixed Cost Variables,” with T. Lin.
- J. Smith (University of Arizona), “Two-Stage Stochastic Risk Threshold and Hierarchical Multiple Risk Problems,” with H. Sherali.
- S. Santos (IMECC-Unicamp), “Reformulations for GSOCCP: Applications to Engineering Problems,” with R. Andreani, A. Friedlander, and M. Mello.
- J. Linderoth (Lehigh University), “A Simplicial Branch-and-Bound Algorithm for Solving Quadratically Constrained Quadratic Programs.” *Not presenting—will leave papers with chair.*

7:00–9:00 pm—**Dinner at The Inn at Virginia Tech**,
Latham Ballroom A

Wednesday, August 17

7:00–8:00 am—**Continental Breakfast and Registration**,
Latham Foyer

8:30–9:20 am—**Plenary Lecture on Global Optimization**,
Chair: T. Terlaky, Latham Ballroom C

- P. Pardalos (University of Florida), “Recent Developments in Multilevel Optimization.”

9:20–10:20 am—**Invited Lectures**, Chair: H. Yoshimura,
Latham Ballroom C

- R. Horst (University of Trier), “Duality Bounds in Global Optimization.”
- T. Terlaky (McMaster University), “How Good are Interior Point Methods? Klee-Minty Cubes Tighten Iteration-Complexity Bounds,” with A. Deza and E. Nematollahi.

10:20–10:30 am—**Tea/Coffee Break**, Latham Foyer

10:30 am–12:00 pm—**Invited Lectures**, Chair: R. Polyak,
Latham Ballroom C

- S. Nash (George Mason), “Factors Affecting the Performance of Optimization-Based Multigrid Methods,” with R. Lewis.
- R. Smith (University of Michigan), “A Fictitious Play Approach to Complex Systems Optimization.”
- B. Fraticelli (Virginia Tech), “Enhanced Formulations and Solution Strategies for Optimal Facility Layout,” with R. Meller and H. Serali.

12:00–1:30 pm—**Lunch**, Latham Ballroom B

1:30–2:15 pm—**Tutorial on Software and Application**,
Chair: R. Horst, Latham Ballroom C

- J. Pinter (Dalhousie University), “Global Optimization—Software Development and Advanced Applications.”

2:30–4:00 pm—**Invited Lectures and Symposia**

Session A: Engineering Optimization, Chair: G. Crespi,
Latham Ballroom C

- C. Lim (University of Arizona), “Discrete and Continuous Multicommodity Network Flow Interdiction,” with J. Smith.
- J. Desai (Virginia Tech), “A Convexification-Based Global Optimization Algorithm for the Allocation of Emergency Response Resources,” with H. Serali.
- V. Ganesan (BDrive Inc.), “Design of Internal Combustion Engine Pistons to Reduce Piston Slap,” with H. Serali.

Session B: Duality, Stochastic Programming, and Computations, Chair: J. Zhou, Duckpond

- W. Han (University of Iowa), “A Posteriori Error Analysis Via Duality Theory.”
- S. Sen (University of Arizona), “A Primal-Dual Approach to Dynamic Stochastic Programs with Decision Policies,” with M. Casey.
- F. Baginski (George Washington University), “The Stability of Pumpkin Balloons.”

Session C: Symposium on Design and Optimization I, Co-Chairs: S. Low and M. Chiang,
Drillfield

- M. Chiang (Princeton University), “Layering as Optimization Decomposition.”
- M. Fazel (California Institute of Technology), “Network Utility Maximization With Nonconcave Utilities Using Sum-of-Squares,” with M. Chiang and S. Low.
- W. Yu (University of Toronto), “Crosslayer Optimization in Multicast Multi-hop Wireless Sensor Networks,” with J. Yuan.

4:00–4:15 pm—**Tea/Coffee Break**, Latham Foyer

4:15–5:45 pm—**Invited Symposia and Parallel Sessions**

Session A: Symposium on Design and Optimization II, Co-Chairs: S. Low and M. Chiang,
Latham Ballroom C

- A. Ozdaglar (Massachusetts Institute of Technology), “Differential Topology for the Uniqueness of Equilibrium and Stationary Points,” with D. Acemoglu and A. Simsek.
- A. Tang (California Institute of Technology), “Equilibrium of Heterogeneous Congestion Control Protocol,” with M. Chiang, S. Low, and J. Wang.
- K. Kar (Rensselaer Polytechnic Institute), “Fair Rate Control using Local Information in Wireless Ad-hoc Networks.”

Session B: Optimization and Applications, Chair:
B. Fraticelli, Duckpond

- A. Fischer (Dresden University), “Improved Local Convergence Results for Proximal Point Algorithms,” with Y. Dong.
- V. Ganesan (BDrive, Inc.), “A Web-Based Framework for CAE Design Exploration and Optimization,” with N. Uchil.
- H. Nagai (University of Tsukuba), “A Two-Phase Conical Branch-and-Bound Algorithm for Linear Programs with an Additional Reverse Convex Constraint,” with T. Kuno.

Session C: Duality in Optimization and Dynamical Systems, Chair: J. Desai, Drillfield

- I. Husain (National Institute of Technology, Srinagar), “Second Order Duality for a Class of Fractional Minimax Programming Problems,” with Abha and A. Ahmed.
- L. Lin (National Changhua University of Education), “Existence Theorems of Two Families of Vector Generalized Quasi-Optimization Problems with Applications,” with Y. Chen.
- I. Husain (National Institute of Technology, Srinagar), “On Nondifferentiable Multiobjective Second Order Symmetric Duality,” with Abha.