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FGV EMAp

BRAZIL - CHINA

OPTIMIZATION WORKSHOP

2026

August 17th and 18th

Auditorium, 12th Floor
FGV EMAp,
Rio de Janeiro, Brazil

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Getulio Vargas Foundation, EMAp, Brazil

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Getulio Vargas Foundation, EMAp, Brazil

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Wayne State University, USA

Benar Fux Svaiter
Institute for Pure and Applied Mathematics, Brazil

Philip Thompson
Getulio Vargas Foundation, EMAp, Brazil

Jinyun Yuan
Dongguan University of Technology, China

OPENING PLENARY SPEAKER

Alfredo Iusem
Getulio Vargas Foundation, EMAp, Brazil

PLENARY SPEAKER

Roberto Andreani
University of Campinas, Brazil

Ernesto Birgin
University of São Paulo, Brazil

Yuhong Dai
Chinese Academy of Sciences, China

Deren Han
Beihang University, China

Evelin Krulikovski
Federal University of Paraná, Brazil

Jinyun Yuan
Dongguan University of Technology, China

SPEAKERS

Roger Behling
Federal University of Santa Catarina, Brazil

Glaydston de Carvalho Bento
Federal University of Goiás, Brazil

Douglas Soares Gonçalves
Federal University of Santa Catarina, Brazil

Max Leandro Nobre Gonçalves
Federal University of Goiás, Brazil

Manoel Jardim
Institute for Pure and Applied Mathematics, Brazil

Majela Penton Machado
Federal University of Bahia, Brazil

Jefferson Gonçalves de Melo
Federal University of Goiás, Brazil

Boris Mordukhovich
Wayne State University, United States

João Carlos de Oliveira Souza
Federal University of Piauí, Brazil

More Information

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Brazil-China Optimization Workshop 2026

Program and Abstracts

August 17-18, 2026

Auditorium, 12th Floor, FGV EMAp
Rio de Janeiro, Brazil

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Official website: eventos.fgv.br/brazilchina2026

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- Benar Fux Svaiter — Institute for Pure and Applied Mathematics, Brazil
- Philip Thompson — Getulio Vargas Foundation EMAp, Brazil
- Jinyun Yuan — Dongguan University of Technology, China

Opening Plenary Speaker

Alfredo Iusem

Plenary Speakers

Roberto Andreani
Ernesto Birgin
Yuhong Dai
Deren Han
Evelin Krulikovski
Jinyun Yuan

Practical Information

The **Brazil-China Optimization Workshop 2026** will take place on **August 17-18, 2026** at **FGV EMAp**, Praia de Botafogo, 190, Botafogo, Rio de Janeiro - RJ, 22250-900, Brazil. Workshop activities are scheduled for the **Auditorium, 12th Floor**. Registration is scheduled for Monday, August 17, from 8:00 to 9:00.

Entrance to FGV. Please note the FGV dress code: shorts, bermudas and flip-flops (such as Havaianas) are not allowed in the FGV buildings.

Official program. The timetable in this booklet follows the workshop's official online program as available on August 16, 2026. For last-minute changes, please consult:

eventos.fgv.br/brazilchina2026/program

FGV EMAp contact. +55 21 3799-5917 · emap@fgv.br

Suggested Restaurants Near FGV

Restaurant	Address	Comment
Salsalito	Praia de Botafogo 228, Stores 117 to 119 — Botafogo	Good self-service restaurant.
Broz	Marquês de Abrantes Street, 216 — Flamengo	Brazilian barbecue.
Garagem	Jorn. Orlando Dantas Street, 43 — Botafogo	Usually a waiting line before 1 pm, but service is quick.
Food Court at Botafogo Praia mall	Praia de Botafogo, 400 — Botafogo	Several options, from fast food to Japanese cuisine.
Miako	Farani Street, 20 — Botafogo	Traditional Japanese food.
Arte SESC Bistrô	R. Marquês de Abrantes, 99 — Flamengo	Gourmet restaurant at an affordable price.
Mizu	Farani Street, 16 — Botafogo	Mexican and Japanese food.
Verde Vício	Visconde de Ouro Preto Street, 47 — Botafogo	Healthy food restaurant.
Port's Self Lanchonete	Marquês de Abrantes Street, 214 — Flamengo	Cheaper self-service option.

Program at a Glance

Time	August 17 (Monday)	August 18 (Tuesday)
8:00 - 9:00	*Registration*	
9:00 - 9:30	*Opening lecture*	**Plenary: Evelin Krulikovski**
9:30 - 10:10	**Plenary: Alfredo Iusem**	Manoel Jardim
10:10 - 10:30	*Coffee Break + Poster*	*Coffee Break + Poster*
10:30 - 11:10	**Plenary: Yuhong Dai**	João Carlos de Oliveira Souza
11:10 - 11:40	Max Gonçalves	Roger Behling
11:40 - 12:10	Boris Mordukhovich	Jefferson Melo
12:10 - 14:00	*Lunch*	*Lunch*
14:00 - 14:40	**Plenary: Jinyun Yuan**	**Plenary: Roberto Andreani**
14:40 - 15:10	Benar Svaiter	Glaydston de Carvalho Bento
15:10 - 15:50	**Plenary: Ernesto Birgin**	Majela Machado
15:50 - 16:10	*Coffee Break + Poster*	*Coffee Break*
16:10 - 16:50	**Plenary: Deren Han**	Philip Thompson
16:50 - 17:20	Douglas Soares Gonçalves	
17:20 - 18:00	*Round table meeting*	*Official dinner*

Venue: Auditorium, 12th Floor, FGV EMAp, Rio de Janeiro, Brazil.

Time Schedule — Monday, August 17

Time	Session
08:00-09:00	*Registration*
09:00-09:30	*Opening lecture*
09:30-10:10	**Alfredo Iusem** Circumcentered direct methods for monotone variational inequalities Getulio Vargas Foundation EMAp, Brazil
10:10-10:30	*Coffee Break + Poster*
10:30-11:10	**Yuhong Dai** Numerical Methods for Symmetric and Nonsymmetric Conic Optimization Chinese Academy of Sciences, China
11:10-11:40	**Max Leandro Nobre Gonçalves** Inexact Cubic Regularization Method with Adaptive Reuse of Hessian Approximations Federal University of Goiás, Brazil
11:40-12:10	**Boris Mordukhovich** Sparse Optimization with Applications to Cancer Research Wayne State University, United States
12:10-14:00	*Lunch*
14:00-14:40	**Jinyun Yuan** The Evolution of China-Brazil Optimization Cooperation Dongguan University of Technology, China
14:40-15:10	**Benar Fux Svaiter** A family of projection splitting methods for the sum of maximal monotone operators Institute for Pure and Applied Mathematics, Brazil
15:10-15:50	**Ernesto Birgin** Recent applications of regularized block coordinate methods University of São Paulo, Brazil
15:50-16:10	*Coffee Break + Poster*
16:10-16:50	**Deren Han** Randomized conjugate gradient least squares Beihang University, China
16:50-17:20	**Douglas Soares Gonçalves** An inexact cubic regularization method for multiobjective optimization Federal University of Santa Catarina, Brazil
17:20-18:00	*Round table meeting*

Time Schedule — Tuesday, August 18

Time	Session
09:00-09:30	**Evelin Heringer Manoel Krulikovski** Sparse Continuous Optimization: From Theory to Practice Federal University of Paraná, Brazil
09:30-10:10	**Manoel Jardim** Solving Quasi-Variational Inequalities Using the Progressive Decoupling of Linkages Institute for Pure and Applied Mathematics, Brazil
10:10-10:30	*Coffee Break + Poster*
10:30-11:10	**João Carlos de Oliveira Souza** Nonmonotone Boosted DC Algorithms: Recent Advances and Applications to Image Restoration Federal University of Piauí, Brazil
11:10-11:40	**Roger Behling** The Method of Ellipcenters for Strongly Convex Minimization Federal University of Santa Catarina, Brazil
11:40-12:10	**Jefferson Gonçalves de Melo** An adaptive line-search-free multiobjective gradient method and its iteration-complexity Federal University of Goiás, Brazil
12:10-14:00	*Lunch*
14:00-14:40	**Roberto Andreani** Title to be confirmed University of Campinas, Brazil
14:40-15:10	**Glaydston de Carvalho Bento** Some Recent Advances in Optimization on Hadamard Manifolds Using Busemann Functions Federal University of Goiás, Brazil
15:10-15:50	**Majela Penton Machado** TBC Federal University of Bahia, Brazil
15:50-16:10	*Coffee Break*
16:10-16:50	**Philip Thompson** Robust Mean Estimation in High Dimensions: A Statistical Optimization Landscape Getulio Vargas Foundation EMAp, Brazil
17:20-18:00	*Official dinner*

Detailed Conference Program

Only the scheduled speaker is shown below. Affiliations are given together with each abstract.

Monday, August 17, 2026

Tuesday, August 18, 2026

Circumcentered direct methods for monotone variational inequalities

Alfredo Iusem

Getulio Vargas Foundation EMAp, Brazil

Opening Plenary Speaker · Monday, August 17, 2026 · 09:30-10:10

Abstract. Circumcentered techniques have been shown to significantly accelerate projectionbased methods for convex feasibility problems. Motivated by this success, we propose two direct methods with circumcenter acceleration for solving variational inequality problems involving two classes of operators: paramonotone and monotone. Both schemes rely on approximate projections onto separating halfspaces, thereby avoiding computationally expensive exact projections. We establish convergence results for both methods and conduct numerical experiments, demonstrating that the proposed algorithms outperform classical methods, such as the extragradient algorithm, by orders of magnitude in terms of computational time, particularly when the feasible set is a complex intersection of convex sets.

Numerical Methods for Symmetric and Nonsymmetric Conic Optimization

Yuhong Dai

Chinese Academy of Sciences, China

Plenary Speaker · Monday, August 17, 2026 · 10:30-11:10

Abstract. This talk presents recent advances in numerical methods for symmetric and nonsymmetric conic optimization. We first introduce a Newton augmented-Lagrangian method based on a smooth barrier augmented-Lagrangian formulation for symmetric cones. The method enjoys an $O(1/\varepsilon)$ global complexity bound and improves the conditioning of the associated Schur complement from $O(1/\mu^2)$ to $O(1/\mu)$. We then present a path-following smoothing Newton method for symmetric conic optimization. By revealing the self-concordant convex–concave structure underlying the reduced smooth barrier augmented-Lagrangian function, we establish an $O(\sqrt{\nu}\log(1/\varepsilon))$ iteration-complexity bound, matching that of short-step interior-point methods. Finally, we consider nonsymmetric conic optimization and develop an interior-point method with conjugate-free scaling. The scaling combines the primal barrier Hessian with a single-secant BFGS update and avoids derivatives of the conjugate barrier. The resulting method also achieves an $O(\sqrt{\nu}\log(1/\varepsilon))$ iteration-complexity bound. Numerical results on symmetric and nonsymmetric conic optimization problems illustrate the practical performance of the proposed approaches.

Inexact Cubic Regularization Method with Adaptive Reuse of Hessian Approximations

Max Leandro Nobre Gonçalves

Federal University of Goiás, Brazil

Invited Speaker · Monday, August 17, 2026 · 11:10-11:40

Abstract. In this talk, we work introduce an inexact cubic regularization method with adaptive reuse of Hessian approximations to solve general non-convex optimization problems. In the proposed approach, the gradient is computed inexactly and updated at every iteration, whereas the Hessian approximation is updated at a specific iteration and then reused for m subsequent iterations (a lazy strategy), where the value of m may vary throughout the procedure. The method can be implemented either in a Hessian-free or a derivative-free manner. Implementations that approximate derivative information via finite-difference schemes are discussed. We provide iteration-complexity guarantees showing that the method reaches an approximate critical point. We also establish bounds on the total gradient and function evaluations required, including the case in which only function values are used. Numerical experiments are reported to illustrate the behavior of the proposed method and to compare its performance with existing lazy cubic algorithms.

Sparse Optimization with Applications to Cancer Research

Boris Mordukhovich

Wayne State University, United States

Invited Speaker · Monday, August 17, 2026 · 11:40-12:10

Abstract. The talk is devoted to investigating single-objective and multiobjective optimization problems involving the ℓ_0-norm function, which is nonconvex and nondifferentiable while being variationally convex. Such problems appear in proton beam therapy models of cancer research. The developed approach uses first-order and second-order subdifferential tools of variational analysis and scalarization techniques of multiobjective optimization. Based on this machinery, we propose several algorithms of the subgradient and generalized Newtonian types and conduct their convergence analysis. The obtained results are illustrated by numerical examples from proton therapy models. Based on the collaboration with the Proton Therapy Center of the Corewell William Beaumont Hospital, Royal Oak, Michigan.

The Evolution of China-Brazil Optimization Cooperation

Jinyun Yuan

Dongguan University of Technology, China

Plenary Speaker · Monday, August 17, 2026 · 14:00-14:40

Abstract. This talk reviews the development of China–Brazil cooperation in optimization, tracing its evolution from early academic exchanges to an increasingly structured and long-term scientific partnership. We first revisit the origins of this collaboration in the 1990s, when visits of researchers, the mobility of young scholars, and exchanges in applied mathematics created important links between the two academic communities. Particular attention is given to several milestone events, including the China–Brazil Symposium on Applied and Computational Mathematics and subsequent bilateral initiatives that helped consolidate cooperation in optimization and operations research.

The talk also highlights the contributions of leading researchers and institutions from both countries, as well as the role of joint projects, reciprocal visits, and the training of young researchers in building a sustainable collaboration network. Finally, we discuss perspectives for the next stage of China–Brazil cooperation, including deeper joint research in optimization theory and algorithms, connections between optimization and artificial intelligence, applications to energy and sustainable development, and more systematic mechanisms for student, postdoctoral, and faculty exchanges. The aim is to provide both a historical perspective and a framework for strengthening future cooperation between the two optimization communities.

A family of projection splitting methods for the sum of maximal monotone operators

Benar Fux Svaiter

Institute for Pure and Applied Mathematics, Brazil

Invited Speaker · Monday, August 17, 2026 · 14:40-15:10

Abstract. We present a projection splitting framework to finding zeros of sums of maximal monotone operator. These methods where proposed for two operators by Eckstein and Svaiter in 2004, and further extended to an arbitrary numbers in 2007. The main idea is to define an extende solution set and the define linear separators for the current iterate and the (extended) solution set. We also discuss subsequent developments and extensions of this framework.

Recent applications of regularized block coordinate methods

Ernesto Birgin

University of São Paulo, Brazil

Plenary Speaker · Monday, August 17, 2026 · 15:10-15:50

Abstract. This talk presents recent developments on regularized block coordinate descent methods for bound-constrained and nonconvex constrained optimization problems. The proposed approaches rely on the solution of regularized models. For bound-constrained problems, we discuss methods based on regularization models of order p, which exhibit asymptotic convergence to pth-order stationary points. We also present complexity results showing that first-order stationarity with precision ε with respect to the variables of each block is achieved in $\mathcal{O}(\varepsilon^{-(p+1)/p})$, while first-order stationarity with precision ε with respect to all variables is achieved in $\mathcal{O}(\varepsilon^{-(p+1)})$. For nonconvex constrained optimization problems, we consider methods based on quadratic regularization. We discuss their convergence properties and show that the number of iterations and function evaluations required to compute a (δ, ε)-critical point is $\mathcal{O}(\varepsilon^{-2})$. The talk concludes with recent applications of these methods to emerging routing problems motivated by last-mile delivery and unmanned aerial vehicle (UAV) operations.

Randomized conjugate gradient least squares

Deren Han

Beihang University, China

Plenary Speaker · Monday, August 17, 2026 · 16:10-16:50

Abstract. We develop a novel randomized conjugate gradient least squares (RCGLS) method for solving least-squares problems, in which iterative sketching is employed at each step to reduce the dimension and hence the computational cost. In particular, we propose a new perspective on the classical CGLS method, where the next descent direction is determined via a constraint correction problem associated with the gradient. Based on this insight, we replace the gradient with a randomized coordinate gradient that naturally satisfies the variance reduction property, leading directly to the proposed RCGLS method. We prove that RCGLS converges linearly in expectation, with a better convergence bound compared to the randomized coordinate descent method. Furthermore, we investigate an implementation of the method that avoids full-dimensional vector operations, which are the major bottleneck of vanilla RCGLS for sparse matrices and render it impractical. We also show how to apply the RCGLS method to solve the ridge regression problem, yielding a lightweight, parallelizable, and accelerated method for such problems. Numerical experiments are provided to confirm our results.

An inexact cubic regularization method for multiobjective optimization

Douglas Soares Gonçalves

Federal University of Santa Catarina, Brazil

Invited Speaker · Monday, August 17, 2026 · 16:50-17:20

Abstract. In this talk we shall discuss a new cubic regularization method for solving nonconvex unconstrained multiobjective optimization problems. This method allows us to use approximations for the first- and second-order derivatives as well as inexact solution of the subproblems. One interesting feature is that the regularization parameter of the model and the accuracy of the derivative approximations are jointly adjusted using a non-monotone acceptance criterion. Implementations of the method where derivative information is computed using finite difference strategies are discussed. Complexity results, global convergence and local convergence rate of the method will be presented.

Sparse Continuous Optimization: From Theory to Practice

Evelin Heringer Manoel Krulikovski

Federal University of Paraná, Brazil

Plenary Speaker · Tuesday, August 18, 2026 · 09:00-09:30

Abstract. In this talk, the goal is to show how continuous optimization with cardinality constraints works in critical decision-making: from safety in financial investments to accuracy in diagnostic imaging. The objective is to keep the audience engaged with recent advances in the field. We will combine mathematical rigor with clear, accessible language and practical examples, exploring recent scalar and multiobjective optimization algorithms. We conclude with open challenges, inviting participants to discover some of the possibilities of sparse optimization.

Solving Quasi-Variational Inequalities Using the Progressive Decoupling of Linkages

Manoel Jardim

Institute for Pure and Applied Mathematics, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 09:30-10:10

Abstract. Inspired by the progressive decoupling of linkages methodology for optimization and variational inequalities, we propose an algorithm for solving quasi-variational inequalities as a sequence of variational inequalities. Our method is shown to converge locally under some regularity conditions and globally when such conditions hold throughout the entire domain. Separately, under other type of assumptions, global convergence with linear rate is also established for the class of quasi variational inequalities with the moving set. Advantageous computational performance is shown for large-scale Walrasian equilibrium problems, formulated as generalized Nash equilibria, as well as for some other instances encountered in the related literature. Joint work with Claudia Sagastizábal and Mikhail Solodov.

Nonmonotone Boosted DC Algorithms: Recent Advances and Applications to Image Restoration

João Carlos de Oliveira Souza

Federal University of Piauí, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 10:30-11:10

Abstract. Many nonconvex optimization problems, in particular image denoising, can be formulated as difference-of-convex (DC) programs. In this talk, we present recent advances in the nonmonotone Boosted Difference-of-Convex Algorithm (nmBDCA), which combines DCA with a boosting step and a nonmonotone line search. We discuss its main theoretical properties and its application to image restoration models with nonconvex total variation regularization. Numerical experiments on image denoising illustrate the effectiveness of nmBDCA in terms of reconstruction quality and computational performance.

The Method of Ellipcenters for Strongly Convex Minimization

Roger Behling

Federal University of Santa Catarina, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 11:10-11:40

Abstract. This presentation is about ME, the Method of Ellipcenters. ME was recently introduced as a first order accelerated scheme for unconstrained minimization. Its iterates are all centers of ellipses carefully designed to somehow capture ill-conditioning of the underlying optimization problem. In the first article on ME, we were able to prove that it converges with linear rate when the objective function is quadratic and strongly convex, while here we derive convergence for any differentiable strongly convex objective. This investigation was inspired by the great performance of ME in quadratic minimization against steepest descent with exact line search, Nesterov, Barzilai-Borwein and Conjugate Gradient. The experiments we carry out now, make ME even more attractive from the numerical point of view. On top of that, the theory seems promising for quite more general settings.

An adaptive line-search-free multiobjective gradient method and its iteration-complexity

Jefferson Gonçalves de Melo

Federal University of Goiás, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 11:40-12:10

Abstract. In this talk, we present an adaptive line-search-free multiobjective gradient (AMG) method for solving smooth multiobjective optimization problems. The AMG method automatically adjusts stepsizes based on steepest descent directions, promoting robustness with respect to stepsize choice while maintaining low computational cost. The method is specifically tailored to the multiobjective setting and does not rely on function evaluations, making it well-suited for this scenario. The proposed algorithm admits two variants: (i) a conservative variant, in which the stepsize is monotonically decreasing; and (ii) a flexible variant, which allows occasional increases in the stepsize. From a theoretical viewpoint, under standard Lipschitz continuity assumptions on the gradients, we establish iteration-complexity bounds for achieving a Pareto critical point for both variants in the nonconvex setting. In the convex setting, we further derive improved iteration-complexity bounds for the conservative AMG variant. From a practical viewpoint, the numerical experiments demonstrate that the flexible AMG performs favorably compared to the steepest descent method with either a fixed stepsize or Armijo line search procedures.

Title to be confirmed

Roberto Andreani

University of Campinas, Brazil

Plenary Speaker · Tuesday, August 18, 2026 · 14:00-14:40

Abstract. *To be confirmed.*

Some Recent Advances in Optimization on Hadamard Manifolds Using Busemann Functions

Glaydston de Carvalho Bento

Federal University of Goiás, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 14:40-15:10

Abstract. In this talk, we investigate the existence of nontrivial affine functions under assumptions on the Ricci curvature. In particular, we extend a result of Bento, Cruz Neto, and Melo (Appl. Math. Optim. 88:83, 2023), originally formulated for the case of negative Ricci curvature on an open set, to manifolds whose Ricci curvature may be nonzero. As a consequence, we establish a new nonexistence criterion for nontrivial affine functions and show that the assumption of nonzero Ricci curvature is, in general, necessary to guarantee such a rigidity conclusion.

Motivated by the problem concerning the nonexpansiveness of the resolvent associated with Busemann functions, introduced by Bento, Cruz Neto, and Melo (J. Optim. Theory Appl. 195:1087–1105, 2022), we introduced a new subdifferential that enabled us to show that the resolvent in question is not only continuous but also firmly nonexpansive and, in particular, nonexpansive. Moreover, this new subdifferential allowed us to identify a condition under which the Fenchel–Young inequality established by Bento, Cruz Neto, and Melo (Appl. Math. Optim. 88:83, 2023) holds with equality. This equality condition is particularly significant because it captures a fundamental duality principle in convex analysis, linking a primal convex function to its conjugate and clarifying the sharpness of the associated inequality on Riemannian manifolds.

TBC

Majela Penton Machado

Federal University of Bahia, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 15:10-15:50

Abstract. *To be confirmed.*

Robust Mean Estimation in High Dimensions: A Statistical Optimization Landscape

Philip Thompson

Getulio Vargas Foundation EMAp, Brazil

Invited Speaker · Tuesday, August 18, 2026 · 16:10-16:50

Abstract. Modern data sets are vulnerable to outliers and rare events, making classical statistical methods, like mean estimation under IID assumptions, unreliable. This issue spurred the development of robust statistics, which introduced resilient estimators such as medians and trimmed means. However, many robust methods, like the Tukey median, are computationally infeasible in high dimensions. Between 2010 and 2015, progress was made with the development of new statistical guarantees and computational techniques, notably by Diakonikolas et al., which led to the field of algorithmic robust statistics. Despite this, practical challenges remain: most methods require knowledge of the population covariance, rely on unknown distributional properties, and cannot robustly estimate covariance matrices in spectral norm—possibly an inherently hard problem. We revisit this problem with a novel lens based on notions from optimization, showing some advancement on these limitations via a precise "optimization landscape" for the robust mean and covariance estimation problem—specifically, a relative inexact Polyak–Lojasiewicz property.