# Marielba Rojas

Researcher

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## RESEARCH INTERESTS

Inverse Problems, Nonlinear Optimization, Numerical Linear Algebra, Computational Science.

## EDUCATION

**Ph.D. in Computational Science and Engineering**, Rice University, Houston, Texas, May 1999. Dissertation: *A Large-Scale Trust-Region Approach to the Regularization of Discrete Ill-Posed Problems.* Advisor: Professor Danny C. Sorensen.

**M.A. in Computational and Applied Mathematics**, Rice University, Houston, Texas, May 1997. Advisor: Professor Danny C. Sorensen.

**M.S. in Computer Science**, Simón Bolívar University, Caracas, Venezuela, June 1991. Thesis: *Efficient Implementation of Interior Point Algorithms for Linear Programming.* Advisor: Professor Marianela Lentini.

**B.S. in Computer Science**, Simón Bolívar University, Caracas, Venezuela, November 1986.

## AWARDS AND HONORS

3TU.AMI Short Term Scientific Mission Grant, November-December 2010.
(With Mike Bochev).

Recovery Factory Grant, Shell Global Solutions International, Rijswijk, The Netherlands, 2010-2014.
(With Arnold Heemink and Jan Dirk Jansen).

Start-up Grant, Technical University of Denmark, 2006-2008.

Science Research Fund Grant, Wake Forest University, 2003-2004.

Science Research Fund Grant, Wake Forest University, 2002-2003.

CONICIT Ph.D. Scholarship, 1992-1996. CONICIT (now FONACIT) is the Science and Technology Council of Venezuela.

Outstanding M.S. Thesis, Simón Bolívar University, Caracas, Venezuela, June 1991.

Dean of Research and Development Grant, Simón Bolívar University, Caracas, Venezuela, 1990.

Citibank Scholarship, 1985-1986.

## PROFESSIONAL EXPERIENCE

### Academia

| | |
|---|---|
| February 2010-<br>February 2014 | Researcher level 1 (courtesy appointment). Department of Geotechnology, Delft University of Technology, Delft, The Netherlands. |
| September 2009-<br>September 2015 | Researcher level 2. Delft Institute of Applied Mathematics, Delft University of Technology, Delft, The Netherlands. |
| 2006-2009 | Associate Professor (with tenure). Department of Informatics and Mathematical Modelling, Technical University of Denmark, Lyngby, Denmark. |
| 2002-2005 | Assistant Professor (tenure-track). Department of Mathematics, Wake Forest University, Winston-Salem, North Carolina, USA. |
| November 1999 -<br>November 2001 | Postdoctoral Researcher. Parallel Algorithms Team, CERFACS, Toulouse, France. |
| Spring 1999 | Postdoctoral Researcher. Department of Informatics, University of Bergen, Bergen, Norway. |
| October 1998-<br>November 1999 | Postdoctoral Research Associate. Department of Computational and Applied Mathematics, Rice University, Houston, Texas. |
| Spring 1995,<br>Fall 1998 | Teaching Assistant. Department of Computational and Applied Mathematics, Rice University, Houston, Texas, USA. |
| 1992-1998 | Research Assistant. Department of Computational and Applied Mathematics, Rice University, Houston, Texas. |
| 1991-1998 | Assistant Professor. Department of Computer Science, Simón Bolívar University, Caracas, Venezuela. On leave from August 1992 to July 1998. |
| 1988-1991 | Instructor. Department of Computer Science, Simón Bolívar University, Caracas, Venezuela. |
| Fall 1987 | Teaching Assistant. Department of Mathematics and Computer Science. Simón Bolívar University, Caracas, Venezuela. |

### Industry

| | |
|---|---|
| July -<br>December 1989 | Senior Programmer. COMTRAD Consultores, Caracas, Venezuela. |
| June -<br>October 1987 | Programmer. Recuperaciones Banconac, Central Bank of Venezuela, Caracas, Venezuela. |
| October 1986-<br>May 1987 | System Administrator. Bases de Datos y Telemática. Caracas, Venezuela. |

## ACCOMPLISHMENTS

TEACHING

- Taught Bachelor's and Master's Programming and Optimization courses at the Technical University of Denmark.
- Taught Mathematics courses at the undergraduate and graduate levels at Wake Forest University.
- Conducted a graduate seminar on Numerical Regularization at University of Bergen, Norway.
- Conducted recitation sessions of a programming course for Engineering undergraduate students at Rice University.
- Taught Computer Science courses at the undergraduate and graduate levels at Simón Bolívar University.

CURRICULUM DEVELOPMENT

- Participated in the development of an introductory programming course for first-year students at the Technical University of Denmark, including development of Lecture Notes and lectures.
- Participated in the revision of the Scientific Computing curriculum at the Technical University of Denmark.
- Participated in the revision of the Mathematics undergraduate curriculum at Wake Forest University.
- Participated in the revision and redesign of the Computer Science undergraduate curriculum at Simón Bolívar University.
- Designed problem sets, computer assignments and tests for Computer Science courses at Simón Bolívar University and Rice University.

SOFTWARE DEVELOPMENT

- Designed, implemented and released the MATLAB software package LSTRS for Large-Scale Trust-Region Subproblems and Regularization.
- Participated in the design and MATLAB implementation of the method MLFIP, a new tool for the study of ill-posed problems.
- Designed and implemented numerical linear algebra and nonlinear optimization software.
- Designed and implemented special applications for system administration purposes.
- Designed and implemented a commercial interpreter for natural language.
- Designed and implemented a file management library for DOS.

ORGANIZATION

- Organized a programming competition for college students at Simón Bolívar University.
- Organized a stamp exhibition at Simón Bolívar University.

MANAGEMENT

- Supervised teaching assistants and programmers.

PROBLEM SOLVING

- Installed and supported personal computer networks for several organizations.
- Assisted in the technical support of a wide variety of computer environments.

## COMPUTER SKILLS

- Architectures: SUN Sparc workstations, PCs, Macintosh, IBM mainframes, CRAY Y-MP, CM-2, Intel iPSC/860, and SGI cluster.
- Operating Systems: Broad knowledge of UNIX and Mac OS X, and experience with VMS, CMS, DOS, and Windows.
- Languages: Proficient in C and FORTRAN. Programming experience with FORTRAN 90, Pascal, Modula, BASIC, REXX, Prolog, Lisp, COBOL, HTML, and Python.
- Libraries and Environments: broad experience with MATLAB, LAPACK, the BLAS, and ARPACK.

## LANGUAGES

Spanish (native), English (C2), Portuguese (C2), French (C1), Dutch (C1), and German (B1).

## PROFESSIONAL AND HONORARY SOCIETIES

Society for Industrial and Applied Mathematics (SIAM).
Colegio de Ingenieros de Venezuela (Engineering Society of Venezuela).
Pi Mu Epsilon.

## COMMUNITY SERVICE

Volunteer Spanish-English Interpreter. Pediatric Injury Clinic, Ben Taub General Hospital, Houston, Texas. 1995-1997.

## UNIVERSITY SERVICE

• At the Delft University of Technology, Delft Institute of Applied Mathematics: organized a graduate-student seminar on Model Order Reduction (September 2010); organized a DCSE symposium on Model Order Reduction (September 2010); organized the Ph.D. course "Model Order Reduction of Dynamical Systems" (Prof. Danny C. Sorensen, Rice, November 2010); organized a 3TU.AMI short-term scientific mission (Prof. Michael Saunders, Stanford, November-December 2010); organized a DCSE symposium on Nonlinear Programming (October 2011), organized the Master/Ph.D. course "Advanced Methods for Constrained Optimization" (Prof. José Mario Martínez, Campinas, October 2011), organized and managed the Master course "Numerical Optimization" (Prof. Marcos Raydan, Simón Bolívar, November-December 2011); the last three activities were sponsored by the Erasmus Mundus program "Computers and Simulation in Science and Engineering" (COSSE).

• At the Technical University of Denmark, Department of Informatics and Mathematical Modelling: Scientific Computing Group Web Page Committee (October 2006-2008), Alumni Committee (Spring 2007), Co-chair of the Colloquium Committee (September 2007-2008).

• At Wake Forest University, Department of Mathematics: Lower-Division Advisor (August 2004-December 2005), Resources Committee and Undergraduate Curriculum Committee (Fall 2004), Library Committee (Spring 2004), Analysis hiring committee (Fall 2003-Spring 2004), Colloquium Committee (January 2002-December 2005) and Chair of the committee (September 2004-December 2005), Math Web Page Committee (January 2002-December 2005).

• At Simón Bolívar University, Department of Computer Science: Undergraduate Curriculum Committee (1989-1990).

## ACADEMIC COMMUNITY SERVICE

• Organizing Committee, meeting on *Numerical Linear Algebra - Algorithms, Applications, and Training*, Delft, The Netherlands, April 2012.

• Master's Thesis Committee of Rahul M. Fonseca, Department of Geotechnology, Delft University of Technology, Delft, The Netherlands, August 2011.

• Program Committee, International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC 2011), Track "Global Optimization in Large-Scale Distributed Systems".

• Ph.D. Thesis Committee of Seyed Ali Vakili Ghahani, Department of Geotechnology, Delft University of Technology, Delft, The Netherlands, November 2010.

• Official External Examiner, Department of Informatics, University of Bergen, Bergen, Norway, 2008-2012. Thesis Committees:

· Bjørn H. Fotland, Master in Informatics, June 2008.

· Torbjørn Lium, Master in Informatics, February 2009.

• Ph.D. Thesis Committee of Ann-Charlotte Berglund, Department of Informatics and Mathematical Modelling, Technical University of Denmark, Lyngby, Denmark, June 2002.

• Reviewer for the following scientific journals:

BIT Numerical Mathematics, Computational Optimization and Applications, Journal of Computational and Applied Mathematics, Linear Algebra and its Applications, Mathematical Programming, Numerical Linear Algebra and Applications, Optimization and Engineering, Optimization Methods and Software, SIAM Journal on Imaging Sciences, SIAM Journal on Matrix Analysis and Applications, SIAM Journal on Optimization, SIAM Journal on Scientific Computing, Systems and Control Letters.

## Ph.D. STUDENTS

• Sławomir Szklarz, **Ph.D. in Applied Mathematics**, Delft University of Technology, Delft, The Netherlands, January 2011-present.

• Johana R. Guerrero, **Ph.D. in Computer Science**, Central University of Venezuela, Caracas, Venezuela, February 2014. Co-advised with Marcos Raydan.

## MASTER'S STUDENTS

• Kien Hoang Nguyen, **Master in Applied Mathematics**, Erasmus Mundus COSSE program, Delft University of Technology, Delft, The Netherlands, June 2014.

• Manuel Baumann, **Master in Applied Mathematics**, Erasmus Mundus COSSE program, Delft University of Technology, Delft, The Netherlands, July 2013. Co-advised with Martin van Gijzen.

• Yonas B. Abraham, **M.S. in Computer Science**, Wake Forest University, Winston-Salem, North Carolina, USA, May 2004. Co-advised with Natalie Holzwarth and Robert Plemmons.

## BACHELOR STUDENTS

• Suzanne de Jong, **Bachelor in Applied Mathematics**, Delft University of Technology, Delft, The Netherlands, June 2010. Co-advised with Martin van Gijzen.

• María Alejandra Pulgar, **Computing Engineering** (5-year program), Simón Bolívar University, Sartenejas, Venezuela, April 1991.

• Supervised more than sixty undergraduate students in **Summer industry internships**, Simón Bolívar University, Sartenejas, Venezuela, 1989-1991.

## PRESENTATIONS

### INVITED LECTURES IN CONFERENCES

• *Efficient Methods for Least-Norm Regularization.*
**Numerical Linear Algebra - Algorithms, Applications, and Training**, Delft, The Netherlands, April 2012.

• *New Methods for Least-Norm Regularization.*
**Householder Symposium XVIII**, Tahoe City, California, USA, June 2011.

• *Efficient Methods for Least-Norm Regularization.*
**Workshop on Optimization, Design and Control at the University of Oxford**, Oxford, England, UK, September 2010.

• *Large-Scale Eigenvalue Problems in Trust-Region Computations.*
**2nd International Kyoto Forum 2010 on Krylov Subspace Methods**, Kyoto University, Kyoto, Japan, March 2010.

• *Trust Regions in Large-Scale Optimization and Regularization.*
**GAMM Workshop Applied and Numerical Linear Algebra with special emphasis on Regularization of Ill-Posed Problems**, Hamburg, Germany, September 2008.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.*
**Householder Symposium XVII**, Zeuthen, Germany, June 2008.

• *TRUST$_\mu$: An Interior-Point Method for Large-Scale Non-Negative Regularization.*
**Gene Golub Around the World Delft**, Delft, The Netherlands, February 29, 2008.

• *Large-Scale Non-negative Regularization.*
**Householder Symposium XV**, Peebles, Scotland, UK, June 2002.

• *Large-Scale Eigenvalue Problems and the Regularization of Discrete Ill-Posed Problems.*
**Plenary talk**, **Householder Symposium XIV**, Whistler, B.C., Canada, June 1999.

• *Regularization of Large-Scale Discrete Ill-Posed Problems.*
**Mathematical Journey through Analysis, Matrix Theory and Scientific Computation: a conference on the occasion of Richard S. Varga's 70th birthday**, Kent, Ohio, USA, March 1999.

### INVITED POSTERS IN CONFERENCES

• *Surrogate Modeling for Geometry Optimization in Material Design.*
**Workshop on Mathematical and Algorithmic Challenges in Electronic Structure Theory**, IMA thematic year on Mathematics and Chemistry, University of Minnesota, Minneapolis, Minnesota, USA, September-October, 2008.

### INVITED LECTURES IN SEMINARS

• *The LSTRS Software for Large-Scale Trust-Region Subproblems and Regularization.* Smart Wells/ISAPP Meeting, **Delft University of Technology**, Delft, The Netherlands, October 2010.

• *Accelerating the LSTRS Algorithm.* Department of Mathematical and Computing Sciences, **Tokyo Institute of Technology**, Tokyo, Japan, March 2010.

• *Optimization Techniques for Large-Scale Inverse Problems.* **Central Research Laboratory**, **Hitachi, Ltd.**, Tokyo, Japan, March 2010.

• *The LSTRS Software for Large-Scale Trust-Region Subproblems and Regularization.*
Department of Mathematics, **Keio University**, Yokohama, Japan, March 2010.

• *Accelerating the LSTRS Algorithm.* Linear Algebra and Optimization Seminar, Institute for Computational Mathematics and Engineering, **Stanford University**, Stanford, California, USA, October 2009.

• *Optimization Techniques for Large-Scale Inverse Problems.* Vision Lab, **University of Antwerp**, Antwerp, Belgium, March 2009.

• *Teaching Programming.* Department of Informatics, **University of Bergen**, Bergen, Norway, February 2009.

• *Trust Regions in Large-Scale Optimization and Regularization.* Department of Mathematics, **Temple University**, Philadelphia, Pennsylvania, USA, October 2008.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* Modelling, Analysis and Simulation Seminars, **CWI**, Amsterdam, The Netherlands, June 2008.

• *A Trust-Region Approach to the Regularization of Large-Scale Discrete Forms of Linear Ill-Posed Problems.* Faculty of Science, Computer Science School, **Central University of Venezuela**, Caracas, Venezuela, January 2008.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* Department of Mathematical and Computing Sciences, **Tokyo Institute of Technology**, Tokyo, Japan, November 2007.

• *Large-Scale Optimization.* MM Seminar, Department of Informatics and Mathematical Modelling, **Technical University of Denmark**, Lyngby, Denmark, September 2007.

• *LSTRS 1.2: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* MM Seminar, Department of Informatics and Mathematical Modelling, **Technical University of Denmark**, Lyngby, Denmark, April 2007.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* Optimization Group Seminar, Department of Information Systems and Algorithms, **Delft University of Technology**, Delft, The Netherlands, January 2006.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* **Center for Research and Advanced Training in Scientific Computing (CERFACS)**, Toulouse, France, November 2003.

• *An Interior-Point Trust-Region-Based Method for Large-Scale Non-Negative Regularization.* Laboratory of Mathematics for Industry and Physics, **Paul Sabatier University**, Toulouse, France, October 2003.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* Department of Informatics and Mathematical Modelling, **Technical University of Denmark**, Lyngby, Denmark, August 2003.

• *Large-Scale Optimization Techniques for the Regularization of Ill-Posed Problems.* Mathematical and Computational Sciences Division, **National Institute of Standards and Technology (NIST)**, Gaithersburg, Maryland, USA, May 2003.

• *Large-Scale Nonnegative Regularization.* Scientific Computing and Computational Mathematics, **Stanford University**, Stanford, California, USA, November 2002.

• *Large-Scale Nonnegative Regularization.* Department of Mathematical Modelling, **Technical University of Denmark**, Lyngby, Denmark, March 2002.

• *Trust-Region-Based Optimization Techniques for the Regularization of Large-Scale Discrete Forms of Ill-Posed Problems.* Department of Mathematics, **Linköping University**, Linköping, Sweden, March 2002.

• *Trust Regions and the Regularization of Large-Scale Discrete Forms of Ill-Posed Problems.* **INRIA**, Rocquencourt, France, March 2001.

• *Trust Regions and the Regularization of Large-Scale Discrete Forms of Ill-Posed Problems.* Department of Mathematical Modelling, **Technical University of Denmark**, Lyngby, Denmark, March 2001.

• *Trust Regions and the Regularization of Large-Scale Discrete Forms of Ill-Posed Problems.* **ExxonMobil Upstream Research**, Houston, Texas, USA, February 2001.

• *Trust Regions and the Regularization of Large-Scale Discrete Forms of Ill-Posed Problems.* Department of Mathematics, **Wake Forest University**, Winston-Salem, North Carolina, USA, January 2001.

• *A Matrix-Free Method for the Large-Scale Trust-Region Subproblem.* Institute for Analysis and Computational Mathematics, Department of Computational Mathematics and Optimization, **Johannes Kepler University Linz**, Linz, Austria, December 2000.

• *A New Method for the Large-Scale Trust-Region Subproblem.* Centre for Mathematics, **University of Coimbra**, Coimbra, Portugal, February 2000.

• *A New Method for the Large-Scale Trust-Region Subproblem.* Laboratory of Mathematics for Industry and Physics, **Paul Sabatier University**, Toulouse, France, February 2000.

• *Large-Scale Eigenvalue Problems, Trust Regions and the Regularization of Discrete Ill-Posed Problems.* TRIP Seminar, **Rice University**, Houston, USA, October 1999.

• *A Trust-Region Approach to the Regularization of Large-Scale Discrete Ill-Posed Problems.* Department of Informatics, **University of Bergen**, Bergen, Norway, May 1999.

• *An Introduction to the Numerical Treatment of Ill-Conditioned Linear Systems and Least Squares Problems.*

• *A Trust-Region Approach to the Regularization of Large-Scale Discrete Ill-Posed Problems.* Department of Mathematics, **Instituto Tecnológico Autónomo de Mexico (ITAM)**, Mexico City, Mexico, September 1998.

• *A Large-Scale Trust-Region Approach to the Regularization of Inverse Problems.* **Western Atlas Logging Services Research Seminar**, Houston, Texas, USA, June 1998.

• *Introduction to Parallel Numerical Methods.* Department of Mathematics, **Federal University of Rio de Janeiro**, Ilha do Fundão, Rio de Janeiro, Brazil, April 1990.

## MINISYMPOSIA

• *Matrix Computations in Large-Scale Optimization.* 9th SIAM Conference on Optimization, Boston, Massachusetts, USA, May 2008.

## MINISYMPOSIUM LECTURES

• *Large-Scale Eigenvalue Problems, Trust Regions, and Regularization.* 9th SIAM Conference on Optimization, Boston, Massachusetts, USA, May 2008.

## CONTRIBUTED LECTURES

• *Efficient Methods for Least-Norm Regularization.* SIAM Conference on Optimization, Darmstadt, Germany, May 2011.

• *Solving Large-Scale Eigenvalue Problems from Optimization.* SIAM Conference on Applied Linear Algebra, Monterey Bay-Seaside, California, USA, October 2009.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regulariz ation.* 9th IMACS International Symposium on Iterative Methods in Scientific Computing, Lille, France, March 2008.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* Computational Methods with Applications, Harrachov, Czech Republic, August 2007.

• *Surrogate modeling for geometry optimization in material design.* 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July 2007.

• *Surrogate Modeling for Electronic-Structure Calculations.* Surrogate Modelling and Space Mapping for Engineering Optimization (SMSMEO-06), Lyngby, Denmark, November 2006.

• *A Comparison of Methods for the Large-Scale Trust-Region Subproblem.* 12th International Congress on Computational and Applied Mathematics (ICCAM 2006), Leuven, Belgium, July 2006.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization.* 11th International Congress on Computational and Applied Mathematics (ICCAM 2004), Leuven, Belgium, July 2004.

• *Large-Scale Optimization Techniques for Nonnegative Image Restorations.* 47th Annual Meeting of the Society for Photo-Optical Engineering (SPIE), Seattle, Washington, July 2002.

• *An Interior-Point Trust-Region-Based Method for Large-Scale Nonnegative Regularization.* Seventh SIAM Conference on Optimization, Toronto, Ontario, Canada, May 2002.

• *Optimization Techniques for Large-Scale Discrete Forms of Ill-Posed Problems.* Applied Inverse Problems 2001, Montecatini Terme, Italy, June 2001.

• *Optimization techniques for image restoration problems.* ISMP 2000, 17th International Symposium on Mathematical Programming, Atlanta, Georgia, August 2000.

• *A Trust-Region Approach to the Regularization of Large-Scale Discrete Ill-Posed Problems.* SFB-Conference on Inverse Problems, Strobl/St. Wolfgang, Austria, June 2000.

• *A New Method for the Large-Scale Trust-Region Subproblem.* Sixth SIAM Conference on Optimization, Atlanta, Georgia, May 1999.

• *Trust Regions and the Regularization of Discrete Ill-Posed Problems.* Fifth SIAM Conference on Mathematical and Computational Issues in the Geosciences, San Antonio, Texas, March 1999.

• *Different Preconditioning Strategies for the Conjugate Gradient Method.* First PanAmerican Workshop for Applied Mathematics, Caracas, Venezuela, January 1993.

• *A Preconditioner for the Conjugate Gradient Method.* V Mathematics Workshop, San Cristóbal, Táchira, Venezuela, June 1992.

• *Implementation of a Primal Potential Reduction Algorithm for Linear Programming.* Fourth SIAM Conference on Applied Linear Algebra, Minneapolis, Minnesota, September 1991.

• *Efficient Implementation of Interior Point Methods for Linear Programming.* PANEL'91, XVII Latin American Conference on Informatics, Caracas, Venezuela, July 1991.

• *Some Considerations for the Implementation of a Primal Potential Reduction Algorithm for Linear Programming.* IV Mathematics Workshop, Caracas, Venezuela, April 1991.

• *Natural Language Processing with Applications.* I Workshop of the Comtrad Group of Venezuela, Puerto Ordaz, Bolívar, Venezuela, October 1989.

**CONTRIBUTED POSTERS**

• M. Rojas, S.P. Szklarz, and M.P. Kaleta. *Efficient Solution of the Optimization Problem in Model-Reduced Gradient-Based History Matching.* Recent Advances on Optimization, Toulouse, France, July 2013.

• M. Rojas, S.P. Szklarz, and M.P. Kaleta. *Efficient Solution of the Optimization Problem in Model-Reduced Gradient-Based History Matching.* SIAM Conference on Computational Science and Engineering, Boston, Massachusetts, February 2013.

• *Efficient Methods for Least-Norm Regularization.* 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011), Vancouver, British Columbia, Canada, July 2011.

• *Surrogate Modeling for Geometry Optimization in Material Design.* ECMI 2008, London, United Kingdom, July 2008.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization*, 9th SIAM Conference on Optimization, Boston, Massachusetts, USA, May 2008.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization*, 6th International Congress on Industrial and Applied Mathematics (ICIAM07), Zurich, Switzerland, July 2007.

• *A Comparison of Methods for the Large-Scale Trust-Region Subproblem*, Sparse Days at CERFACS, Toulouse, France, June 2006.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems*, 12èmes Journées du Groupe MODE, Le Havre, France, March 2004.

• *LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems*, Sparse Days and Grid Computing at St. Girons, St. Girons, France, June 2003.

• *Regularization of Discrete Ill-Posed Problems.* Annual meeting of the Center for Research in Parallel Computation, Houston, Texas, May 1997.

## PUBLICATIONS

### INVITED

• M. Rojas, B.H. Fotland, and T. Steihaug. Large-scale eigenvalue problems in trust-region calculations. ***Proceedings of the 2nd International Kyoto Forum 2010 on Krylov Subspace Methods***, Kyoto, Japan, March 2010.

### REFEREED

• M. Rojas, B.H. Fotland, and T. Steihaug. Computational and sensitivity aspects of eigenvalue-based methods for the large-scale trust-region subproblem. ***Optimization Methods and Software***, 28(3):564-580, 2013.

• J. Guerrero, M. Raydan, and M. Rojas. A hybrid-optimization method for large-scale non-negative full regularization in image restoration. ***Inverse Problems in Science and Engineering***, 21(5):741-766, 2013.

• S.P. Szklarz, M. Rojas, and M.P. Kaleta. Efficient solution of the optimization problem in model-reduced gradient-based history matching. In ***Proceedings of the 13th European Conference on the Mathematics of Oil Recovery (ECMOR XIII)***, A27, pages 1-17, 2012.

• H. Madrid, V. Guerra, and M. Rojas. Sampling techniques for Monte Carlo matrix multiplication with applications to image processing. ***Lecture Notes in Computer Science***, 7329:45-54, 2012.

• S.P. Szklarz, M. Rojas, and M.P. Kaleta. The optimization problem in model-reduced gradient-based history matching. In ***Proceedings of the 2012 IFAC Workshop on Automatic Control in Offshore Oil and Gas Production***, volume 1, pages 13-18, 2012.

• J. Lampe, M. Rojas, D.C. Sorensen, and H. Voss. Accelerating the LSTRS algorithm. ***SIAM Journal on Scientific Computing***, 33(1):175-194, 2011.

• M. Rojas, Y.B. Abraham, N.A.W. Holzwarth, and R.J. Plemmons. Surrogate modeling for geometry optimization. ***Progress in Industrial Mathematics at ECMI 2008***, Springer ***Mathematics in Industry*** series, 15:1011-1016, 2010.

• M. Rojas, S.A. Santos, and D.C. Sorensen. Algorithm 873: LSTRS: MATLAB software for large-scale trust-region subproblems and regularization. ***ACM Transactions on Mathematical Software***, 34(2):11, 2008.

• M. Rojas, Y.B. Abraham, N.A.W. Holzwarth, and R.J. Plemmons. Surrogate modeling for geometry optimization in material design. ***Proceedings of the Sixth International Congress on Industrial and Applied Mathematics (ICIAM07)***, Special Issue of *Proceedings in Applied Mathematics and Mechanics (PAMM)*, 7(1), 2007.

• L. Eldén, P.C. Hansen, and M. Rojas. Minimization of linear functionals defined on solutions of large-scale discrete ill-posed problems. ***BIT Numerical Mathematics***, 45(2):329-340, 2005.

• M. Rojas and T. Steihaug. Large-Scale Optimization Techniques for nonnegative image restorations. ***Proceedings of SPIE***, Vol. 4791: 233-242, 2002.

• M. Rojas and T. Steihaug. An interior-point trust-region-based method for large-scale non-negative regularization. ***Inverse Problems***, 18(5):1291-1307, 2002.

• M. Rojas and D.C. Sorensen. A trust-region approach to the regularization of large-scale discrete forms of ill-posed problems. ***SIAM Journal on Scientific Computing***, 23(6):1843-1861, 2002.

• M. Rojas, S.A. Santos, and D.C. Sorensen. A new matrix-free algorithm for the large-scale trust-region subproblem. ***SIAM Journal on Optimization***, 11(3):611-646, 2000.

**THESES**

• M. Rojas. *A Large-Scale Trust-Region Approach to the Regularization of Discrete Ill-Posed Problems.* Ph.D. Thesis, available as Technical Report 98-19, Department of Computational and Applied Mathematics, Rice University, May 1998.

• M. Rojas. *Efficient Implementation of Interior Point Algorithms for Linear Programming.* Master's Thesis, Department of Computer Science, Simón Bolívar University, Caracas, Venezuela, March 1991. Available in Spanish only.

**LECTURE NOTES**

• B. Dammann, P.C. Hansen, M. Rojas, J.B. Sand, and C.T. Larsen. *An Introduction to Programming using MATLAB.* Department of Informatics and Mathematical Modelling, Technical University of Denmark, Lyngby, 250 pages, June 2010. ISBN: 978-87-643-0483-1.

• M. Rojas and B. Dammann. *An Introduction to Programming using MATLAB.* Lecture Notes for courses 02631/02633, Department of Informatics and Mathematical Modelling, Technical University of Denmark, Lyngby, 145 pages, September 2008.

**TECHNICAL REPORTS**

• M. Rojas, B.H. Fotland, and T. Steihaug. *Computational and sensitivity aspects of eigenvalue-based methods for the large-scale trust-region subproblem - extended version.* Technical Report 13-01, Delft Institute of Applied Mathematics, Delft University of Technology, Delft, The Netherlands, January 2013.

• M. Rojas, B.H. Fotland, and T. Steihaug. *Large-scale eigenvalue problems in trust-region calculations.* Technical Report 10-12, Delft Institute of Applied Mathematics, Delft University of Technology, Delft, The Netherlands, April 2010.

• D.C. Sorensen and M. Rojas. *Efficient numerical methods for least-norm regularization.* Technical Report 10-10, Delft Institute of Applied Mathematics, Delft University of Technology, Delft, The Netherlands, March 2010.

• M. Rojas. *Regularization of large-scale ill-conditioned least squares problems.* Technical Report 96-32, Department of Computational and Applied Mathematics, Rice University, Houston, Texas, USA, October 1996.