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Date and Place of Birth

September 12, 1979 - Sahagún, Cordoba; Colombia.

Education

PhD in Mathematics, March 2008.
Instituto Nacional de Matemática Pura e Aplicada-IMPA, Rio de Janeiro, Brazil.

Master of Sciences in Applied Mathematics, April 2004.
Instituto Nacional de Matemática Pura e Aplicada-IMPA, Rio de Janeiro, Brazil.

Bachelor in Mathematics, June 2001.
Universidad de Cartagena, Cartagena de Indias, Colombia.

Research

Institute for Applied Mathematics and Computational Science (IAMCS) and Institute for Scientific Computation (ISC), Texas A&M University College Station, TX
Postdoctoral Research Associate Fall 2011-present
Dimension Reduction and coarse spaces construction
Domain decomposition preconditioners for multiscale flow in porous media.
Preconditioning of the Stokes-Darcy mortar coupling.
Finite elements for random elliptic partial differential equations.
Domain decomposition preconditioners for discontinuous Galerkin discretization of elliptic problems with discontinuous coefficients.

Texas A&M (www.math.tamu.edu) College Station, TX
Visiting Assistant Professor Fall 2008-Spring 2011
Domain decomposition preconditioners for multiscale flow in porous media.
Preconditioning of the Stokes-Darcy mortar coupling.
Finite elements for random elliptic partial differential equations.
Domain decomposition preconditioners for discontinuous Galerkin discretization of elliptic problems with discontinuous coefficients.

IAMCS (iamcs.tamu.edu) Innovation grant Multiscale finite element methods for flow in porous media.	College Station, TX Summer 2010
IAMCS (iamcs.tamu.edu) Innovation grant (1 month summer salary) Domain decomposition preconditioners for multiscale flow in porous media.	College Station, TX June 2009
IMPA (www.impa.br) Short Term Visiting Finite elements for random equations.	Rio de Janeiro, Brazil (Mar-Aug)2008
IMPA (www.impa.br) Research Assistant Professor Marcus Sarkis. Finite elements for well-reservoir coupling(2004). Discretization and preconditioning of the Stokes-Darcy mortar coupling(2005-2008). Finite elements for random elliptic partial differential equations(2006-2008). Domain decomposition preconditioners for discontinuous Galerkin discretization of elliptic problems with discontinuous coefficients(2006- March 2008).	Rio de Janeiro, Brazil 2004-(Feb)2008
WPI (www.wpi.edu) Research Assistant Professor Marcus Sarkis. Finite elements for random elliptic partial differential equations. Domain decomposition preconditioners for discontinuous Galerkin discretization of elliptic problems with discontinuous coefficients.	Worcester, USA Sep-Nov 2006

Teaching

Texas A&M University:

Graduate courses

Methods of Applied Mathematics I, MATH 601, fall 2010

Undergraduate courses

Differential Equations, Math 308 (2 classes), spring 2011.

Differential Equations, Math 308 (2 classes), spring 2010.

Differential Equations, Math 308, fall 2009.

Engineering Math I (2 classes), spring 2009.

Engineering Math I, fall 2008.

King Abdullah University of Science and Technology, KAUST

Graduate courses

Multiscale and Domain Decomposition Methods, summer 2011

IMPA (Teaching assistantship):

Graduate courses

- PDE in Finance (Probability and Stochastic Process), January/February 2008.
- Computational Methods in Finance: Linear Algebra, March/June 2007.
- Numerical Analysis, March/July 2007.
- PDE in Finance (Probability and Stochastic Process), January/February 2007.
- PDE: Linear Theory, January/February 2006.
- PDE in Finance (Probability and Stochastic Process), January/February 2006.
- Linear Algebra, March/July 2005.
- Functional Analysis, January/February 2005.
- Numerical Analysis, March/July 2005.
- Complex Variable, August/November 2005.

Undergraduate courses

- Introduction to Scientific Computing, January/February 2005.

Publications and Working Papers

Published (refereed journals and refereed conference proceedings)

16. V. CALO, Y. EFENDIEV AND J. GALVIS, *A note on variational multiscale methods for high-contrast heterogeneous flows with rough source terms*. *Advances in Water Resources*, 34 (9), September 2011, pp. 1177-1185.
15. Y. EFENDIEV, J. GALVIS, AND X.-H. WU, *Multiscale finite element methods for high-contrast problems using local spectral basis functions*. *Journal of Computational Physics*. Volume 230, Issue 4, 20 February 2011, Pages 937-955.
14. Y. EFENDIEV, J. GALVIS, AND P. VASSIELVSKI, *Spectral Element Agglomerate Algebraic Multigrid Methods for Elliptic Problems with High-Contrast Coefficients*, in *Domain Decomposition Methods in Science and Engineering XIX*, Huang, Y.; Kornhuber, R.; Widlund, O.; Xu, J. (Eds.), Volume 78 of *Lecture Notes in Computational Science and Engineering*, Springer-Verlag, 2011, Part 3 , pp. 407-414.
13. Y. EFENDIEV AND J. GALVIS, *A Domain Decomposition Preconditioner for Multiscale High-Contrast Problems*, in *Domain Decomposition Methods in Science and Engineering XIX*, Huang, Y.; Kornhuber, R.; Widlund, O.; Xu, J. (Eds.), Volume 78 of *Lecture Notes in Computational Science and Engineering*, Springer-Verlag, 2011, Part 2, pp. 189-196.
12. J. GALVIS AND M. SARKIS, *FETI-DP for Stokes-Mortar-Darcy Systems*, in *Domain Decomposition Methods in Science and Engineering XIX*, Huang, Y.; Kornhuber, R.; Widlund, O.; Xu, J. (Eds.), Volume 78 of *Lecture Notes in Computational Science and Engineering*, Springer-Verlag, 2011, Part 2, pp. 221-228.
11. M. DRYJA, J. GALVIS AND M. SARKIS, *N-N Solvers for a DG Discretization for Geometrically Nonconforming Substructures and Discontinuous Coefficients*, in *Domain Decomposition Methods in Science and Engineering XIX*, Huang, Y.; Kornhuber, R.; Widlund, O.; Xu, J. (Eds.), Volume 78 of *Lecture Notes in Computational Science and Engineering*, Springer-Verlag, 2011, Part 1, pp.27-38.

10. J. GALVIS AND Y. EFENDIEV, *Domain decomposition preconditioners for multiscale flows in high contrast media. Reduced dimension coarse spaces*. Multiscale Model. Simul. Volume 8, Issue 5, pp. 1621-1644 (2010)
9. J. GALVIS AND Y. EFENDIEV, *Domain Decomposition Preconditioners for Multiscale Flows in High-Contrast Media*, Multiscale Model. Simul. Volume 8, Issue 4, pp. 1461-1483 (2010).
8. J. GALVIS AND M. SARKIS, *FETI and BDD preconditioners for Stokes-Mortar-Darcy Systems*. Commun. Appl. Math. Comput. Sci. Vol. 5 (2010), No. 1, 1-30
7. J. GALVIS AND M. SARKIS, *Approximating infinity-dimensional stochastic Darcy's equations without uniform ellipticity*. SIAM J. Numer. Anal. Volume 47(2009), Issue 5, pp. 3624-3651
6. J. GALVIS AND M. SARKIS, *A Priori error estimates and FETI preconditioners for Coupling Stokes-Darcy Equations*, in *Memorias de la Escuela Internacional CIMPA-UNESCO-REALMA "Matemáticas para el modelamiento y la simulación*, Published by the Universidad del Valle, eds. Marc Lassonde and Olga Vasilieva., 2008.
5. M. DRYJA, J. GALVIS AND M. SARKIS, *Balancing domain decomposition methods for discontinuous Galerkin discretization*, in *Domain Decomposition Methods in Science and Engineering XVII*, Ulrich Langer et al. (eds.), vol. 60 of *Lecture Notes in Computational Science and Engineering*, Springer-Verlag, 2008, pp. 271-278.
4. M. DRYJA, J. GALVIS AND M. SARKIS, *BDDC Methods for discontinuous Galerkin discretization of elliptic problems*. J. Complexity. Vol. 23 (2007), pp. 715-739
3. J. GALVIS AND M. SARKIS, *Non-matching mortar discretization analysis for the coupling Stokes-Darcy equations*. Electron. Trans. Numer. Anal. Vol. 26 (2007), pp. 350-384 .
2. J. GALVIS AND M. SARKIS, *Balancing domain decomposition methods for mortar coupling Stokes-Darcy systems*, in *Domain Decomposition Methods in Science and Engineering XVI*, D. Keyes and O. B. Widlund, eds., vol. 55 of *Lecture Notes in Computational Science and Engineering*, Springer, 2007, pp. 373-380.
1. J. GALVIS AND M. SARKIS, *Inf-sup for coupling Stokes-Darcy*, In: *XXV Iberian Latin American Congress in Computational Methods in Engineering*, 2005, Recife. *Proceedings of the XXV Iberian Latin American Congress in Computational Methods in Engineering*, Recife, Brazil, 2004. Published by the Universidade Federal de Pernambuco, eds. Abimael Loula et al., 2004.

Accepted (refereed journals and refereed conference proceedings)

- Y. EFENDIEV, J. GALVIS, S. KI KANG AND R. LAZAROV, *Robust multiscale domain decomposition method for nonlinear flows in highly heterogeneous media*. *Numerical Mathematics: Theory , Methods and Applications*.
- Y. EFENDIEV AND J. GALVIS, *Coarse-Grid Multiscale Model Reduction Techniques for Flows in Heterogeneous Media and Applications*. Chapter of *Numerical Analysis of Multiscale Problems*, *Lecture Notes in Computational Science and Engineering*, Vol. 83.

- M. DRYJA, J. GALVIS AND M. SARKIS, *Neumann-Neumann methods for a DG discretization of elliptic problems with discontinuous coefficients on geometrically non-conforming substructures.*

Submitted

Y. EFENDIEV, J. GALVIS AND F. THOMINES, *A systematic coarse-scale model reduction technique for parameter-dependent flows in highly heterogeneous media and its applications*

Y. EFENDIEV, J. GALVIS AND E. GILDIN, *Local-global multiscale model reduction for flows in highly heterogeneous media.*

Y. EFENDIEV, J. GALVIS, R. LAZAROV AND J. WILLEMS, *Robust Solvers for Symmetric Positive Definite Operators and Weighted Poincaré Inequalities.* Submitted to Large-Scale Scientific Computing: 8th International Conference, LSSC 2011, Sozopol, Bulgaria,

J. GALVIS AND M. SARKIS, *Regularity results for the ordinary product stochastic pressure equation*

Y. EFENDIEV, J. GALVIS, R. LAZAROV AND J. WILLEMS, *Robust domain decomposition preconditioners for abstract symmetric positive definite bilinear forms.*

In preparation

Y. EFENDIEV, R. LAZAROV, P. CHATZIPANTELIDIS, ... (on higher order finite volume methods)

Y. EFENDIEV, E. GILDIN, A. ROMANOVSKAYA and, ... (on local-global model reduction approaches)

V. CALO, Y. EFENDIEV,(on high-contrast problems, ms and dpg)

Y. EFENDIEV, S. WEISSER, R. LAZAROV, ...(on bem based mixed fem)

E. TEIXEIRA, H. VERSIEUX,(on free interface problems)

Y. EFENDIEV, J. WEI,.... (on ensemble-level preconditioning and ms)

Y. EFENDIEV, S. KI KANG AND R. LAZAROV,... (on multiscale fem for nonlinear flows in porous media)

Y. EFENDIEV, J. GALVIS AND P. VASSIELVSKI, *Analysis of spectral multigrid methods for high-contrast problems.*

J. GALVIS AND M. SARKIS, *Analysis of FETI-DP for Stokes/Darcy coupling.*

J.S. AZEVEDO, J. GALVIS, S. OLIVEIRA AND M. SARKIS, ...

Y. EFENDIEV, J.GALVIS, S. KI KANG AND R. LAZAROV, *Robust multiscale domain decomposition method for nonlinear flows in highly heterogeneous media.*

Y. EFENDIEV, J.GALVIS, M.S. PAULETTI, *Multiscale methods on rough surfaces*

Other publications

4. J. GALVIS AND H. VERSIEUX, *Introdução a Aproximação Numérica de Equações Diferenciais Parciais Via o Método de Elementos Finitos*. Lecture notes for a minicourse in the 28^o Colóquio Brasileiro de Matemática IMPA, Rio de Janeiro, 18 a 29 de julho de 2009.
3. J. GALVIS, *Introdução aos métodos de decomposição de domínio*. Lecture notes for a minicourse in the 27^o Colóquio Brasileiro de Matemática IMPA, Rio de Janeiro, 27 a 31 de julho de 2009.
2. J. GALVIS, *Domain decomposition analysis for heterogeneous Darcy's flow*, PhD thesis, Instituto Nacional de Matemática Pura e Aplicada, March 2008.
1. J. GALVIS, *Finite elements for well-reservoir coupling*, master's thesis, Instituto Nacional de Matemática Pura e Aplicada, April 2004.

Presentations

34. *Métodos numéricos para problemas en medio porosos heterogéneos*. Departamento de Matemáticas - Universidad Nacional de Colombia. Oct. 26, 2011.
33. *Robust Multiscale Solvers for Stokes/Darcy Coupling*. SIAM Conference on Mathematical & Computational Issues in the Geosciences, Long Beach, California, March 21-24, 2011.
32. *Multilevel Model Reduction Approaches for Flows in Multiscale Porous Media*. SIAM Conference on Mathematical & Computational Issues in the Geosciences, Long Beach, California, March 21-24, 2011.
31. *Regularity for stochastic coefficient elliptic problems*, The finite element rodeo 2011, Texas A&M on February 25-26.
30. POSTER PRESENTATION: *Multiscale model reduction for flows in high-contrast media*, IAMCS Workshop in Large-Scale Inverse Problems and Uncertainty Quantification, Texas A&M, February 24-25, 2011.
29. *Spectrally Constructed Coarse Spaces*, 20th International Conference on Domain Decomposition Methods at UC San Diego, in La Jolla, California, February 7-11, 2011.
28. *Domain Decomposition for High-Contrast Problems*. Texas A&M Numerical Analysis Seminar, October 27, 2010.
27. *A weighted Poincare inequality and applications to Domain Decomposition*. Texas A&M Postdoc Colloquiums, October 14, 2010.
26. *FETI Methods for Mortar Coupling of Stokes-Darcy Systems*. SIAM Annual Meeting, Pittsburgh, July 12-16, 2010.
25. *Multiscale Simulation Techniques for High-Contrast Subsurface Flows*, Pervasively Parallel Solutions for Partial Differential Equations (PPS4PDEs), KAUST, Saudi Arabia, May 2-5, 2010.
24. *Wiener-Chaos finite element methods for the approximation of infinite-dimensional stochastic elliptic equations*. Computational Mathematics Seminar Series, Center of Computation and Technology, LSU, Baton Rouge, LA, April 12, 2010.

23. *Numerical homogenization for high-contrast elliptic problems using local spectral basis functions.* 33rd Annual Texas Partial Differential Equations Conference TXPDE, April 10-11, 2010 University of Texas at Austin.
22. *POSTER PRESENTATION: Domain decomposition preconditioners for multiscale flows in high contrast media.* InterPore 2010 Conference and Annual Meeting. March 14-17, Texas A&M University, College Station, TX, 2010.
21. *Domain decomposition preconditioners for multiscale flows in high contrast media.* Spring 2010 Finite Element Rodeo, Southern Methodist University, Dallas, TX, March 5-6, 2010.
20. *Coarse spaces for high-contrast multiscale problems.* Workshop on Multiscale/multi-physics discretizations, solvers, and coupling for engineering applications. KAUST, Saudi Arabia, January 30, 2010.
19. *FETI and FETI-DP for Darcy-Mortar-Stokes systems.* SIAM Conference on Analysis of Partial Differential Equations. Miami, Florida, December 7-10, 2009
18. *Chaos finite elements.* Texas A&M Postdoc Colloquiums. October, 2009.
17. *FETI for Darcy-Mortar-Stokes systems.* 19th International Conference on Domain Decomposition Methods, Zhangjiajie, China, August 17-22, 2009.
16. *Multiscale finite element methods for high-contrast problems.* 19th International Conference on Domain Decomposition Methods, Zhangjiajie, China, August 17-22, 2009.
15. *Minicourse: Introdução aos métodos de decomposição de domínio.* 27^o Colóquio Brasileiro de Matemática IMPA, Rio de Janeiro, 27 a 31 de julho de 2009.
14. *Wiener-Chaos finite element approximations for the Darcy's equation in random porous media.* Finite Element Rodeo, Institute for Computational Engineering and Sciences The University of Texas at Austin. Feb. 27 & 28, 2009.
13. *Domain Decomposition Analysis for Heterogeneous Darcy's Flow.* Numerical Analysis Seminar at Department of Mathematics Texas A&M University, September 2008.
12. *Domain Decomposition Analysis for Heterogeneous Darcy's Flow.* Prêmio Odelar Linhares Apresentações das Teses Indicadas SBMAC 2008. July 07-08, 2008. Honorable Mention.
11. *Preconditioners for DG discretization of elliptic problems on geometrically nonconforming substructures at.* Computational and Mathematical Challenges in Waves, Wells & Weather, IMPA Rio de Janeiro, March 24-28, 2008.
10. *Neumann-Neumann methods for DG discretization of elliptic problems on geometrically non-conforming substructures.* X Workshop em Equações Diferenciais Parciais-Impa, August 2007, Rio de Janeiro, Brazil.
9. *Domain Decomposition Method for discontinuous Galerkin discretization of elliptic problems with discontinuous coefficients.* ESCUELA CIMPA-UNESCO-REALMA-COLOMBIA Matemáticas para modelamiento y simulación, June 2007, Cali, Colombia.
8. *Discretization analysis for the coupling of free fluid flow with porous media flow.* ESCUELA CIMPA-UNESCO-REALMA-COLOMBIA Matemáticas para modelamiento y simulación , June 2007, Cali, Colombia.

7. *Discretization analysis for the coupling of free fluid flow with porous media flow*. PDE Seminar at Worcester Polytechnic Institute (WPI), November 2006.
6. *Discretization of Stokes/Darcy Coupling*. Workshop: Discontinuous Galerkin and Multiscale Finite Element Methods for Partial Differential Equations - Theory and Applications. Universidade Federal de Santa Catarina, February 2006, Santa Catarina, Brazil.
5. *Mortar Discretization For Coupling Stokes Darcy, discrete inf-sup conditions and error analysis*. IX Workshop em Equações Diferenciais Parciais-Impa, July 2005, Rio de Janeiro, Brazil.
4. *Inf-sup for coupling Stokes-Darcy*. XXV Latin American Congress on Computational Methods in Engineering, CILAMCE XXV, November, 2004, Recife, Brazil.
3. *Finite Elements for well-reservoir coupling*. Rio Oil and Gas Expo and Conference 2004. October 4-7, 2004. Rio de Janeiro, Brazil.
2. *Finite Elements for well-reservoir Coupling*. The SPE 2004 South American and Caribbean Student Presentation and Paper Contest, June 17 - 18, 2004 at Vitória - ES (Brazil).
1. *Inf-sup condition for the coupling of Stokes and Darcy equations*. 1st LNCC Meeting on Computational Modeling, August, 2004, Petrópolis, Brazil.

Awards

- Postdoc/Early Career Travel Award to attend the SIAM Conference on Mathematical and Computational Issues in the Geosciences (GS 11)
- Honorable Mention: Odelar Linares award, Brazil, 2008.
- ANP Fellowship ((sep)2002-(feb)2004)
- CNPQ Fellowship (2004-2006)
- PEC-PG (CAPES) Fellowship (2006-2007)
- Mención de Honor por rendimiento académico 2001, University of Cartagena.
- Joven talento para la investigación de la comisión regional para la ciencia y tecnología de la costa Caribe.

Skills

- Languages: Spanish (native) and advanced Portuguese and English.
- Computer Skills: Matlab, C++, Maple, Mathematica.