Tiago Salvador

Contact

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Education

2012–2017 **Ph.D. in Mathematics**, *Department of Mathematics, McGill University*.
- Thesis title: Numerical methods for nonlinear elliptic partial differential equations
- Thesis advisor: Professor Adam Oberman

2010–2012 **M.Sc in Mathematics and Applications**, *Instituto Superior Técnico, Universidade de Lisboa*.
- Thesis title: Convergence of numerical methods for viscosity solutions through the adjoint method
- Thesis advisor: Professor Diogo Gomes

2007–2010 **B.Sc in Applied Mathematics and Computation**, *Instituto Superior Técnico, Universidade de Lisboa*.

Employment

09/2017– **Post-Doctoral Assistant Professor**, *Department of Mathematics, University of Michigan*.
- Mentor: Professor Selim Esedoḡlu

Research Interests

Nonlinear partial differential equations, finite difference methods, viscosity solutions, convergence of numerical approximations, threshold dynamics, deep learning.

Preprints

[1] Tiago Salvador and Selim Esedoglu. The Role of Surface Tension and Mobility Model in Simulations of Grain Growth. https://arxiv.org/abs/1907.11574 *Submitted.*

[2] Adam M. Oberman and Tiago Salvador. A Partial Differential Equation Obstacle Problem for the Level Set Approach to Visibility. https://arxiv.org/abs/1908.00578 *Submitted.*

Journal Publications

[1] Tiago Salvador and Selim Esedoglu. A simplified threshold dynamics algorithm for isotropic surface energies. *Journal of Scientific Computing* **79**(1): 648-669, 2019.

[2] Brittany Froese Hamfeldt and Tiago Salvador. Higher-order adaptive finite difference methods for fully nonlinear elliptic equations. *Journal of Scientific Computing* **75**(3): 1282-1306, 2018.

[3] Adam M. Oberman and Tiago Salvador. Numerical methods for motion of level sets by affine curvature. *IMA Journal of Numerical Analysis*, **38**(4):1735-1767, 2018.

[4] Brittany D. Froese, Adam M. Oberman, and Tiago Salvador. Numerical methods for the 2-Hessian elliptic partial differential equation. *IMA Journal of Numerical Analysis*, **37**(1):209-236, 2017.

[5] Adam M. Oberman and Tiago Salvador. Filtered schemes for Hamilton-Jacobi equations: a simple construction of convergent accurate difference schemes. *Journal of Computational Physics* **284**:367-388, 2015.

Conference Proceedings

[1] Tiago Salvador. Curvas Elípticas. In J. P. Boavida, R. P. Carpentier, L. Cruz-Filipe, P. S. Gonçalves, E. Grifo, D. Henriques, A. R. Pires, editors, *Números, cirurgias e nós de gravata: 10 anos de Seminário Diagonal no IST*, pages 175-184. IST Press, 2012.

[2] Tiago Salvador and Manuel Cabral Morais. The traveling salesman problem and the Gnedenko theorem. In António Pacheco, Rui Santos, Maria do Rosário Oliveira, and Carlos Daniel Paulino, editors, *New Advances in Statistical Modeling and Applications*, Studies in Theoretical and Applied Statistics, pages 197-206. Springer, Cham, 2014.

Grants, Awards and Honours

2015 **SIAM Student Travel Award**, *Source: SIAM*.
Travel award plus gratis conference registration to attend SIAM conference on Analysis of Partial Differential Equations.

2013 **Mathematics and Statistics Teaching Assistant Award**, *Source: Department of Mathematics and Statistics, McGill University*.
This prize is awarded to the best Teaching Assistent in the Mathematics Department.

2013-2017 **PhD Scholarship**, *Source: Foundation of Science and Technology (Portugal)*.
PhD fellowship.

2011 **FCT Scientific initiation scholarship**, *Source: Foundation of Science and Technology (Portugal)*.

2009,2010 **Novos Talentos da Matemática**, *Source: Calouste Gulbenkian Foundation*.
This prize is awarded to estimulate promising students to pursue research in Mathematics.

2008,2011 **Academic Merits Award**, *Source: Instituto Superior Técnico, Universidade de Lisboa*.
This prize is awarded to the top 3 students in the mathematics program.

Conference presentations

Apr 2019 **A simplified threshold dynamics algorithm for isotropic surface energies**.
SIAM Great Lakes Section Meeting, Ann Arbor, MI

Apr 2019 **Γ-convergence of threshold dynamics algorithms**.
MRS Spring Meeting: Symposium on Mathematical Aspects of Materials Science-Modeling, Analysis and Computations, Phoenix, AZ

Jan 2019 **Γ-convergence of threshold dynamics algorithms**.
JMM Meeting: SIAM Minisymposium on Advances in mathematical modeling of complex materials systems, Baltimore, MD

Jul 2018 **Algorithms for fully anisotropic, continuum models of grain boundary motion**.
SIAM Conference on Mathematical Aspects of Materials Science: Grain Boundaries and Interfaces from Atomistic Structures to Continuum Modeling, Portland, OR

Jul 2018 **Higher-order adaptive finite difference methods for fully nonlinear elliptic equations**.
SIAM Annual Meeting: Numerical Methods for PDEs, Portland, OR

Nov 2016 **Filtered schemes for Hamilton-Jacobi equations: a simple construction of convergent accurate difference schemes**.
Workshop on Numerical Methods for Hamilton-Jacobi equations in optimal control and related fields in Linz, Austria

Dec 2015 **Numerical methods for the 2-Hessian elliptic partial differential equation**.
SIAM conference on Analysis of Partial Differential Equations, Scottsdale, AZ

May 2015 **Filtered schemes for Hamilton-Jacobi equations**.
8th Montreal Scientific Computing Days, Montreal

Jul 2014 **Convergent filtered schemes for the eikonal equation**.
SIAM Annual Meeting: Numerical Methods for Viscosity Solutions and Applications, Chicago, IL

Seminar Talks

Nov 2018 **Numerical methods for degenerate elliptic PDEs**.
Applied Interdisciplinary Mathematics at University of Michigan, MI

Aug 2017 **Numerical methods for degenerate elliptic PDEs**.
Capsule Research Talks at University of Michigan, MI

Mar 2017 **Building Accurate Convergent Finite Difference Schemes for Elliptic Partial Differential Equations**.
Fluid Mechanics and Waves Seminar, New Jersey Institute of Technology NJ

Mar 2011 **The Travelling Salesman Problem**.
Seminário Diagonal at Instituto Superior Técnico, Lisbon

Dec 2009 **Cryptography and Elliptic Curves**.
Seminário Diagonal at Instituto Superior Técnico, Lisbon

Nov 2009 **Elliptic Curves**.
Seminário Diagonal at Instituto Superior Técnico, Lisbon

Research stay

Summer 2019 **McGill University**, *Invited by Adam Oberman*, 3 months.

Spring 2018 **McGill University**, *Invited by Adam Oberman*, 6 weeks.

Winter 2017 **New Jersey Institute of Technology**, *Invited by Brittany Froese Hamfeldt*, 4 weeks.

Teaching Experience

Lecturer, University of Michigan

Fall 2018 **Linear spaces and matrix theory**, *Math 419*.

Winter 2018 **Numerical Methods for Engineers and Scientists**, *Math 371/Engr 371*.

Fall 2017 **Calculus 1**, *Math 115*.

Lecturer, McGill University

Fall 2016 **Numerical Analysis**, *Math 317*.

Winter 2015 **Linear Algebra**, *Math 223*.

Teaching Assistant, McGill University

Fall 2015 **Numerical Analysis**, *Math 317*.

Fall 2014 **Numerical Analysis**, *Math 317*.

Winter 2014 **Linear Algebra and Geometry**, *Math 133*.

Fall 2013 **Numerical Analysis**, *Math 317*.

Service

Referee, *Advances in Difference Equations, Journal Of Computational Physics, Mathematics of Computation, Numerical Algorithms, SIAM Journal on Numerical Analysis, SIAM Journal on Scientific Computing, Journal of Computational and Applied Mathematics*.

Jul 2018 **Session chair**, *Numerical Methods for PDEs*, SIAM Annual Meeting 2018.

Fall 2017 **Activity leader**, *FEMMES*, University of Michigan.

- Organized a capstone math activity aimed for 4th to 6th grade girls.

2014, 2015 **VP Academic**, *Graduate Student Association of Mathematics Students*.

- Organized activities for graduate students.
- Served as a student representative on the Committee of Graduate Affairs.

Relevant Skills

Languages

Portuguse	Native	French	Functional
English	Fluent	Spanish	Basic knowledge

Programming Languages

Generic	C (reasonable knowledge), Python, PyTorch
Math	Mathematica, Matlab
Other	LaTeX, Github