Genival F F Da Silva Jr

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Employment

Assistant Professor, Texas A& M University San Antonio, 2023 -

Assistant Professor, Eastern Illinois University, USA 2021-2023

Research Associate, Imperial College London, UK, 2016 - 2019

Education

Ph.D. Mathematics, Washington University in St. Louis, USA, 2012-2016

Thesis title: On the limiting behavior of variations of Hodge structures.
Advisor: Matt Kerr

M.A. Mathematics, Washington University in St. Louis, USA, 2014

B.S. Mathematics, Universidade Federal do Piaui, Brazil, 2012

Major GPA: 9/10, finishing the 4 years degree in 3 years.

Research Interests

Analysis of PDE

I'm interested in nonlinear elliptic PDEs and elliptic systems, problems related to existence and regularity of solutions.

Publications

Journal Articles & Preprints

1. An elliptic equation with power nonlinearity and degenerate coercivity.
   Preprint – available online

2. An inhomogeneous p-laplacian equation with a Hardy potential. Under peer review (Advanced Nonlinear Studies)

3. Quasilinear elliptic equations with superlinear convection. Under peer review (Calculus of Variations and Partial Differential Equations)
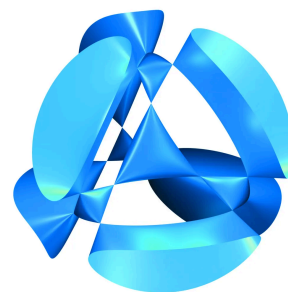
4. On a fully nonlinear k-Hessian system of Lane-Emden type. Under peer review (Manuscripta mathematica)

5. Radially symmetric solutions to a Lane-Emden type system. Under peer review (Nonlinear Analysis)

6. (with James Lewis) The Complexity of Higher Chow Groups, Canadian Math. Bull. , 2023.

7. (with James Lewis) The Chow motive of a Fano variety of k-planes, Communications in Algebra , 2023.

8. Lyapunov exponents for G2 variations of Hodge structures. Preprint

9. (with Tom Coates and Alessio Corti) On the topology of Fano smoothings Interactions with Lattice Polytopes, Springer, 2022.

10. On the monodromy of elliptic surfaces, Israel Journal of Mathematics, 2022, DOI: s11856-022-2458-4

11. Notes on the Hodge Conjecture for Fermat Varieties, Experimental Results , Volume 2 , 2021 , e22, DOI: 10.1017/exp.2021.14

12. On the arithmetic of Landau-Ginzburg model of a certain class of threefolds, CNTP Vol. 13, No. 1, 2019, DOI: 10.4310/cntp.2019.v13.n1.a5

13. (with Matt Kerr and Greg Pearstein) Arithmetic of degenerating principal variations of Hodge structure: examples arising from mirror symmetry and middle convolution. Canad. J. Math. 68, 2014, DOI: 10.4153/CJM-2015-020-4

Teaching Experience

Real Analysis, Texas A&M, Fall 2024

Intro to Proofs, Texas A&M, Fall 2024

College Alebgra, Texas A&M, Spring 2024

Calculus II, Texas A&M, Spring 2024

College Algebra, Texas A&M, Fall 2023

Differential Equations, Eastern Illinois University, Spring 2023

Calculus I, Eastern Illinois University, Spring 2023

Finite Mathematics, Eastern Illinois University, Spring 2023

Brief Calculus, Eastern Illinois University, Fall 2022

College Algebra, Eastern Illinois University, Fall 2022

Mathematics: A Human Endeavor, Eastern Illinois University, Fall 2022

Calculus I, Eastern Illinois University, Spring 2022

College Algebra, Eastern Illinois University, Spring 2022

Mathematics: A Human Endeavor, Eastern Illinois University, Spring 2022

College Algebra, Eastern Illinois University, Fall 2021

Finite Mathematics, Eastern Illinois University, Fall 2021

Mathematics: A Human Endeavor, Eastern Illinois University, Fall 2021

Algebraic geometry, Imperial College London, Spring 2019

Smooth Manifolds, Imperial College London, Fall 2017

Calculus II, Washington University, Spring 2015

Calculus I, Washington University, Fall 2013

Calculus for Economics II , UFPI, Brazil, Spring 2012

Advising

Undergraduate Research Projects

James Lawrence (2018-2019), Imperial College London

Project: The mirror map and its applications.

Guillermo Ayuso (2018-2019), Imperial College London

Project: Hodge theory applications in Mirror symmetry.

Gabriel Kassayie (2018-2019), Imperial College London

Project: Lefschetz theorem on algebraic cyles.

Tanuj Gomez (2017-2018), Imperial College London

Project: Complex Manifolds and Sheaf Cohomology.

Selected Invited talks

"The Hodge Conjecture: a million dolar probelm!", EIU Mathematics Colloquium, US.

"On the complexity of Higher Chow Groups", WUSTL Algebraic Geometry Seminar, US.

"Hodge Conjecture For Fermat Varieties", WUSTL Algebraic Geometry Seminar, US.

"On the geometry of Elliptic surfaces", Brazilian Algebraic Geometry Seminar.

"Surfaces with Exceptional monodromy", Cambridge-Oxford-Warwick seminar, UK.

"Mirror symmetry and CY variations", Nottingham, UK.

"On the arithmetic of Landau-Ginzburg models of a certain class of threefolds", Imperial College London, UK.

"Surfaces with Exceptional monodromy", FRG workshop, Stony Brook, US.

"LG-models, regulators and normal functions", Workshop on "Arithmetic and Geometry of Algebraic Varieties", Fields Institute, Toronto, Canada.

"Math circle", Coloring graphs, part II, Washington University, US.

"Math circle", Coloring graphs, Washington University, US.

"On the Hodge conjecture for Abelian varieties", Washington University, US.

"A survey of Monodromy", Undergraduate Colloquium, Universidade Federal do Piaui, Brazil.

"The Hopf-Fibration", Seminar, Universidade Federal do Piaui, Brazil.

"Yoneda's lemma", Seminar, Universidade Federal do Piaui, Brazil.

Awards & Grants

Student Academic Choice Award nomination for Best Teaching for Undergraduates, Imperial College, 2018

Washington University Graduate Fellowship, 2012-2016

Science without borders grant, around $120.000, Brazilian National Science Foundation, 2012-2016

REUNI UROP grant, $3600, Universidade Federal do Piaui, Brazil, 2012

Milenio Young scientist grant, IMPA, Brazil, 2009-2010

1st place out of >300 at B.S. Mathematics selection process, Universidade Federal do Piaui, 2008.

Computer Code

Algorithmic proof of the Hodge conjecture for Fermat varieties satisfying a numerical condition.
[Github]

Automated way of computing the Betti Numbers of Fano Toric 3-folds
[Github]

Graph after monodromy on the base space of a family of elliptic curves degenerating
[Github]

Programming languages

Advanced: **Python**, Sage, Magma

Familiar: Macaulay2, Maple, Javascript, C#

Languages

Native: Portuguese

Fluent: English, Spanish

Reading: French