MOHAMED EL FAROUK OUNANE

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Github: https://github.com/farouk-ounane

PRESENTATION

I am a mathematician and creative coder with a strong background in differential geometry, partial differential equations, numerical methods, computational geometry and computer graphics. Skilled in bridging mathematical theory with practical implementations, simulations, and creative coding. I am passionate about tackling challenging problems, optimizing algorithms, and delivering innovative solutions in a collaborative environment. We are now in 2025, I have almost completed my Ph.D in Mathematics and I am looking for new opportunities.

EDUCATION

PhD: Dynamical Systems and Applications. MAR. 2022 – Present
Djillali Liabes University Sidi Bel Abbès, Algeria

Master's: Mathematics and Applications | ***Specialization: Geometry*** SEPT. 2019 – SEPT. 2021
Houari Boumediene University of Science and Technology Algiers, Algeria

Bachelor's in Mathematics SEPT. 2016 – JUNE 2019
University of Algiers 1 Algiers, Algeria

PROFESSIONAL EXPERIENCE

Teaching Assistant FEB 2020 – JUNE 2023
National Polytechnic School Algiers, Algeria

- Analysis 1
- Analysis 2

PROFESSIONAL EXPERIENCE

Lecturer (Chargé de Cours) SEPT 2024 – Present
University of Algiers 1, Department of Computer Science Algiers, Algeria

- Probability and Statistics, Third Year Computer Science (L3 SI), 1st semester (Sept 1, 2024 – Jan 30, 2025)
- Probability and Statistics, First Year Computer Science (L1 Info), from Feb 1, 2025 – Present

Teaching Assistant (Chargé de T.D.) FEB 2020 – JUNE 2024
National Polytechnic School Algiers, Algeria

- Analysis 1
- Analysis 2

PH.D THESIS

Some Existence Results for Solutions to Elliptic PDEs on Riemannian Manifolds | 2024

MASTER'S THESIS

On the Arnold-Liouville Theorem in Hamiltonian Mechanics | 2021

Publications

Multiplicity of Solutions for an Elliptic Problem Involving GJMS Operator 2024
Filomat, Volume 38, Issue 5

Existence and Uniqueness Results for a Singular Kirchhoff Type Equation on a Closed Manifold 2024
Differential Geometry and its Applications, Volume 93

Conferences and Seminars

A Multiplicity Result for a Q-Curvature Type Problem on Closed Riemannian Manifolds June 8, 2024
Mathematics and Computer Science Seminar, Sidi Bel Abbès

A Singular Kirchhoff-Type Problem on a Closed Riemannian Manifold October 22, 2024
National Workshop on Partial Differential Equations, Sidi Bel Abbès

On a Singular Kirchhoff-Type Equation on a Closed Manifold November 12, 2024
MAMM 2024, Université Chadli Bendjedid El Tarf, Algeria

Infinitely Many Solutions for a Perturbation of the Prescribed Q-Curvature Problem November 19–20, 2024
WIMAM 2024, Université de Guelma

Honors and Awards

Valedictorian | Master's: Mathematics and Applications 2019-2021
Houari Boumediene University of Science and Technology Algiers, Algeria

Valedictorian in Bachelor's 2016-2019
University of Algiers 1 Algiers, Algeria

Skills

Numerical Methods

- Finite element methods, and variational techniques for solving elliptic PDEs.
- Optimization, Optimization with constraints, Optimization on Manifolds, Linear Programming.
- Computational Optimal Transport.

Computational Geometry & Graphics

- **Rendering Techniques:** Ray-Tracing, Ray-Marching, Sphere Tracing, Signed Distance Functions.
- **Differential Geometry and PDE tools:** Laplacian Smoothing, Gaussian Curvature, Heat Kernel Signature.
- **Mesh Reconstruction:** Poisson Surface Reconstruction, Marching Cubes.

Programming

- Proficient in **C++** (including **SDL** and **OpenGL**), **GLSL shader programming**, **Python**, **Matlab**, and **LaTeX**.

Creative Coding

- Skilled in **Processing** and **p5.js** for generative art, procedural animation, and interactive visualizations.

Languages

- Arabic (Native).
- French (C2).
- English (C2).