

Fellowships CIMPA Program (report)

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I. Informations

Name: Nguyen Dang

Firstname: Tuyen

Home Institution: Hanoi University of Civil Engineering.

Cursus (Master, PhD, post-doc,...): PhD

Title of the Program: *New trends and applications around generalized Fokker-Planck operators*

Location and dates of stay: Bernoulli Center, Swiss Federal Technology Institute of Lausanne. Address: GA 3 34, Bâtiment GA, Station 5, 1015 Lausanne, Switzerland. Dates of stay: June 15 – July 12, 2025

Details of expenses covered by CIMPA: travel tickets + visa fee + per diem (total 2389€)

V. Activity Report

List the series of courses, workshops and conferences you have attended and describe briefly your research work.

- During this program, I attended four mini-courses over the four weeks:

+ Week 1 (June 16-June 20): “Hypoellipticity and various pseudodifferential methods” by Prof. O. Mohsen.

+ Week 2 (June 23-June 27): “Hodge type Laplacians and their hypoelliptic deformations” by Prof. F. Nier.

+ Week 3 (June 30-July 4): “Analysis of stochastic processes and applications to molecular dynamics and numerical methods” by Prof. T. Lelièvre.

+ Week 4 (July 7-July 11): “Accurate spectral analysis of (non) self-adjoint, (hypo)elliptic operators” by Prof. F. Nier.

- In addition, I attended several specialized talks given by other professors, and other participants.

- I also gave two talks in Young researchers session.

- Describe briefly my research work: My research is in the field of Geometric Analysis.

+ I am interested in harmonic and p -harmonic forms, which are related to Hodge theory. In details, I have obtained some results on vanishing properties of p -harmonic forms on Riemannian manifolds and weighted p -harmonic forms on weighted Riemannian manifolds.

+ Additionally, I am studying some important geometric partial differential equations on Riemannian manifolds. In this direction, I have established some new gradient estimates and applied them to prove Liouville-type results for solutions of the equations.