

CHRISTINA MAHMOUD

✉ christina.mahmoud@umontpellier.fr | 🌐 christinamahmoud.github.io | 📄 Christina Mahmoud | 📧 Christina Mahmoud
| Montpellier, France | 07 71 52 42 44

ACADEMIC BACKGROUND AND EXPERIENCE

Since 2023 of Montpellier, France Supervisor :	PhD in Applied Mathematics — CNRS / Institut Montpelliérain Alexander Grothendieck (IMAG), University of Montpellier, France Hélène Mathis — helene.mathis@umontpellier.fr
Thesis topic :	<i>Approximation of hyperbolic systems with relaxation; application to two-phase flows (ongoing PhD thesis)</i>
Main research topics :	<ul style="list-style-type: none">Construction of two <i>unsplit asymptotic-preserving</i> schemes for hyperbolic systems with relaxation.Relative entropy analysis for asymptotic preserving schemes to the Jin & Xin modelHierarchy of hyperbolic relaxation models (two-phase flows).
2024–2026 Teaching load :	Additional teaching duties — University of Montpellier, France 63 h/year (2024–2026); 48 h (2023–2024)
Courses taught :	Scientific reasoning (L1–SVSE) <small>HAV220X</small> ; Mathematical tools 3 (L1–PCSI) <small>HAS202X</small> ; Remedial mathematics (L1–SVSE) <small>HAS202X</small>
2022–2023 M2 internship :	Master 2 (MANU) — Modelling and Numerical Analysis — University of Montpellier, France LAMPS — University of Perpignan, France
Supervisor :	Mikaël Barboteu — barboteu@univ-perp.fr
Co-supervision :	Francesco Bonaldi — francesco.bonaldi@univ-perp.fr ; Serge Dumont — serge.dumont@univ-perp.fr
Title :	A mathematical and numerical formulation of hyperelastic problems for the modelling of soft biological tissues (6 months)
Work :	hyper-visco-elasticity; numerical approximation and analysis; solution via <i>Primal–Dual Active Set method</i> ; simulations
2021–2022	Private mathematics tutor for high-school students.
2019–2021 M2 internship :	Master's degree — Fundamental and Applied Mathematics — Lebanese University, Beirut, Lebanon <i>Institut P' (PPrime)</i> — University of Poitiers, France (4 months)
Work :	high-performance computing; turbulence; natural convection; numerical analysis and simulations
2016–2019	Bachelor's degree — Mathematics — Lebanese University, Beirut, Lebanon

PUBLICATIONS

Published articles

- M. Barboteu, F. Bonaldi, S. Dumont, C. Mahmoud.** *An energy-consistent discretization of hyper-viscoelastic contact models for soft tissues.* **Computer Methods in Applied Mechanics and Engineering**, 2024, In press. <https://doi.org/10.1016/j.cma.2024.116785>

Submitted work

- C. Mahmoud, H. Mathis.** *Asymptotic Preserving Schemes for Hyperbolic Systems with Relaxation.* **Preprint (HAL)**, 2025, HAL-05291431 v1. <https://cnrs.hal.science/IMAG-MONTEPELLIER/hal-05291431v1>

Work in progress

- Relative entropy analysis for asymptotic preserving schemes to the Jin & Xin model. [In preparation]
- Relative entropy analysis of a Hierarchy of Phase-Change Relaxation Models.

CONFERENCES

Talks

10/2024 **CJC-MA2024** — *Uniformly accurate asymptotic-preserving schemes for hyperbolic systems with relaxation.*
Lyon (FR)

Posters

06/2025 **Numerical Methods for Hyperbolic Problems** — *Unsplit asymptotic-preserving schemes for hyperbolic systems with relaxation.*
Darmstadt (DE)

- 05/2025 **Seventh Workshop on Compressible Multiphase Flows** — *Unsplit asymptotic-preserving schemes for hyperbolic systems with relaxation.*
Strasbourg (FR)
- 06/2024 **New Trends in the Numerical Analysis of PDEs** — *Uniformly accurate schemes for hyperbolic relaxation systems.*
Lille (FR)
- 06/2024 **Sixth Workshop on Compressible Multiphase Flows** — *Uniformly accurate schemes for hyperbolic relaxation systems.*
Strasbourg (FR)

COMPUTING SKILLS

- Python* Development of simulation and analysis codes (PhD work).
- C++* Scientific programming (M2 MANU practical sessions) — *beginner*.
- R* Data analysis tools — *beginner*.
- MODULEF* Finite element code: use and adaptation — *beginner*.
- Maple, MATLAB* Symbolic and numerical computation (second-year practicals) — *beginner*.

LANGUAGES

- Arabic* Reading, writing, speaking.
- French* Reading, writing, speaking.
- English* Reading, writing, speaking.

ADMINISTRATIVE ACTIVITIES

- Since 2025** Member of the ANGUS team (Inria), supervised by Nicolas Seguin.
- 2022** **Early childhood educator** — Fingerprints, Beirut (Lebanon).
- 2019** Participation in the organisation of the international conference **LICMA'19** (Mathematics and Applications), Lebanese University — Hadath, Lebanon.