2nd CSI

Development of hybrid finite element/neural network methods to help create digital surgical twins

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June 12, 2025

anr MIMESIS Inria

Supplementary work

Supplementary work I

Teaching

- 2024/2025 :
  - 64h of Computer Science Practical Work - L1S2 and L2S3 (Python) / L3S6 (C++)
  - 3 days supervising a group of high school girls in RJMI ("Rendez-vous des Jeunes Mathématiciennes et Informaticiennes")
- 2023/2024 : 50h of Computer Science Practical Work - L2S3 (Python) / L3S6 (C++)

Training courses (Total : 176h35)

- A dozen seminars organized by IRMA ($\approx 10h$)
- 1 Deep Learning introductory course - FIDLE ($\approx 40h$)
- 2 workshops on Scientific Machine Learning ($\approx 2 \times 21h$)
- 1 summer school on "New Trend in computing" ($\approx 27h$)
- several cross-disciplinary courses - Methodology, scientific English, etc. ($\approx 58h$)

Supplementary work II

Talks

- **ICOSAHOM 2025, Montréal** - July 2025 *(Coming soon...)*
  "Enriching continuous Lagrange finite element approximation spaces using neural networks"
- **DTE & AICOMAS 2025, Paris** - February 20, 2025
  "Combining Finite Element Methods and Neural Networks to Solve Elliptic Problems on 2D Geometries"
- **Exama project, WP2 reunion** - March 26, 2024
  "How to work with complex geometries in PINNs ?"
- **Retreat (Macaron/Tonus)** - February 6, 2024
  "Mesh-based methods and physically informed learning"
- **Team meeting (Mimesis)** - December 12, 2023
  "Development of hybrid finite element/neural network methods to help create digital surgical twins"

Supplementary work III

Posters

- **EMS-TAG-SciML 2025, Milan** - March 24, 2025 - "Enriching continuous Lagrange finite element approximation spaces using neural networks"
- **CJC-MA 2024, Lyon** - October 29, 2024 - "Combining Finite Element Methods and Neural Networks to Solve Elliptic Problems on 2D Geometries"
- **MSII poster day, Strasbourg** - October 24, 2024
- **SciML 2024, Strasbourg** - July 08, 2024

Publications

- Enriching continuous lagrange finite element approximation spaces using neural networks. *(submitted in February 2025, M2AN journal)*
  H. Barucq, M. Duprez, F. Faucher, E. Franck, **F. Lecourtier**, V. Lleras, V. Michel-Dansac, and N. Victorion.