

**ChEESE**

## **Work Package 7: Dissemination, outreach and community building**

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# Update: ChEESE Website



**ChEESE in a nutshell**

ChEESE-2P is a cutting-edge initiative aimed at tackling some of the most pressing challenges in geoscience through exascale computing.

**Funded by Horizon EuroHPC.** ChEESE-2P continues its legacy by preparing and optimizing flagship computational codes for exascale systems.

Now, the project expands to new disciplines and enhanced performance metrics, enabling the scientific community to **harness HPC for geohazards**.

**11 FLAGSHIP CODES**

At the heart of ChEESE-2P are 11 community flagship codes designed to address 12 domain-specific Exascale Computational Challenges.

**12 CHALLENGES**

The codes span **various geoscience domains**, including computational seismology, magnetohydrodynamics, physical volcanology, and tsunamis, with new additions in geodynamics and glacier hazard modeling.

The project focuses on **optimizing these codes for performance, scalability, and portability** across diverse hardware architectures emerging from the EuroHPC Pilots.

This involves **co-designing with mini-apps**, enhancing single-node and multi-node efficiency, and continuous performance monitoring.

**PILOT DEMONSTRATORS**

To showcase the real-world applications of these flagship codes, ChEESE is developing nine Pilot Demonstrators that will be tested in 15 Simulation Cases.

**Key Challenges Addressed**

- Earthquake Simulations
- Tsunami Simulations
- Volcanic Eruption Forecasting
- Glacier Hazard Assessments

**Outcomes and Contributions**

- Valuable datasets via European Open Science Cloud (EOSC)
- Services for urgent computing
- Early warning systems
- Comprehensive hazard assessments

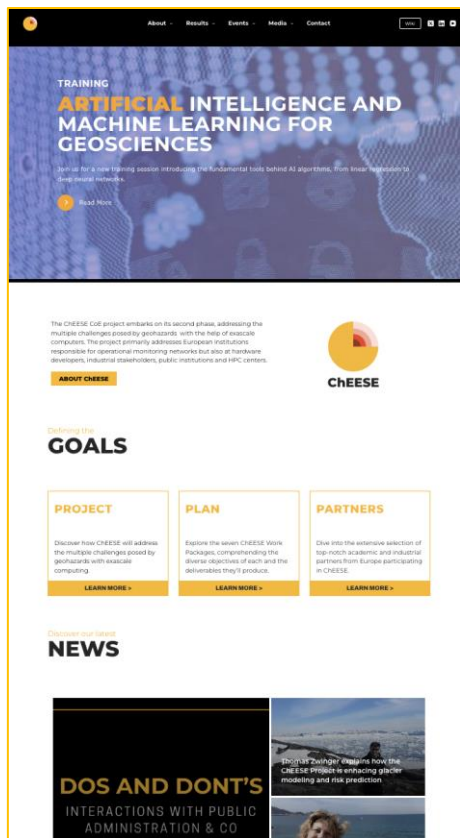
[WWW.CHEESE2.EU](http://WWW.CHEESE2.EU)



**20 posts** in the 'News' section: including articles, infographics, training sessions, interviews, etc.

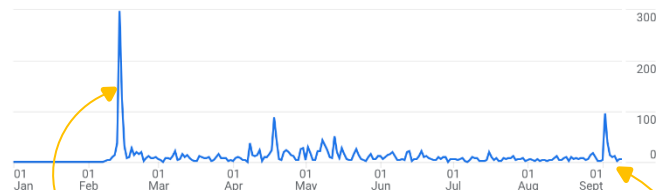


# Update: ChEESE Website



## Sessions measured on Google Analytics:

- Goal M24: 3,000 per year
- Real: 2,200 Q3 of 2024; 2,345 in 2023
- This year, the two peaks in visits correspond with the announcement of two ChEESE trainings



'Good Science' in EuroHPC CoEs

AI and ML for Geosciences

# Update: Social Media Jan 2023 – Sept 2024



@ChEESE\_CoE on X:

- **Followers:** 1,207
- **Impressions:** Average of 336 per month
- **Engagement:** Average of 6.5 per post



TOP ENGAGEMENT: 20



TOP IMPRESSIONS: 2295

# Update: Social Media Jan 2023 – Sept 2024

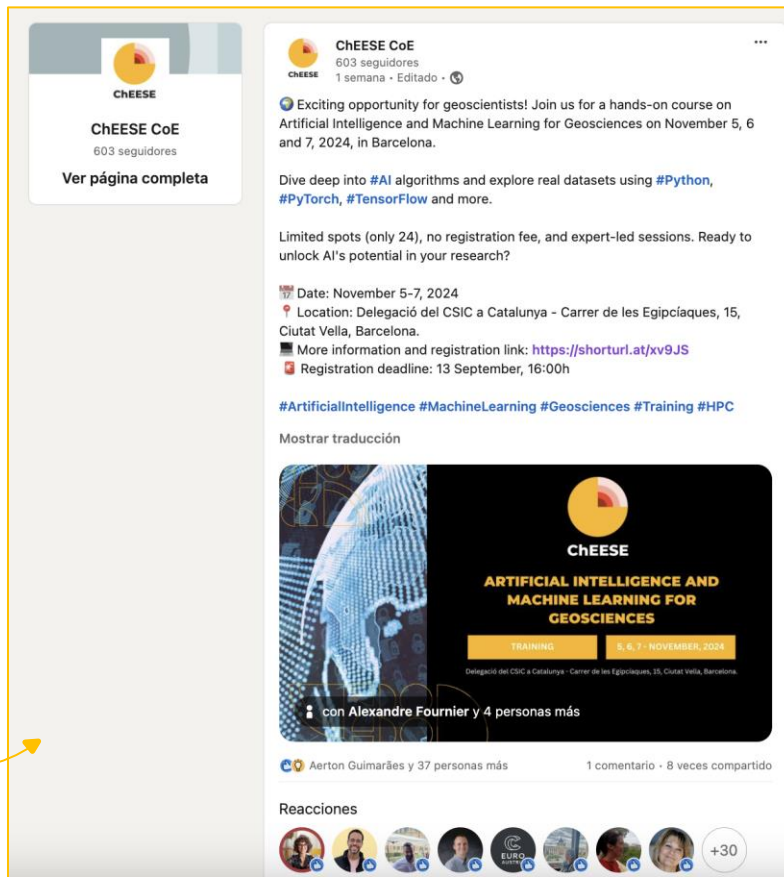


## @ChEESE CoE on LinkedIn:

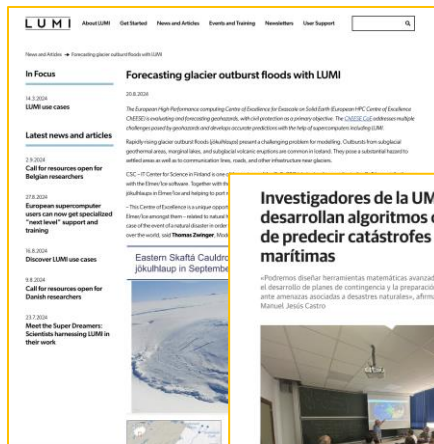
- **Followers:** 603 (we reached our goal!)
- **Organic impressions:** Average of 80 per month
- **Clicks:** Average of 5.92 per post

## Top Content:

- Training announcements
- The most liked and viewed post is for the training “AI and ML for Geosciences”.

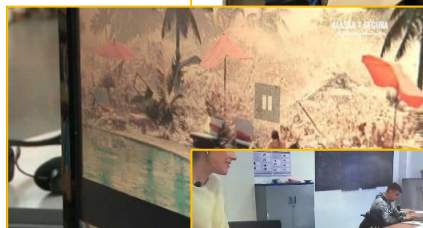


# Update: Press of 2024



## Investigadores de la UMA desarrollan algoritmos capaces de predecir catástrofes marítimas

«Podemos diseñar herramientas matemáticas avanzadas que facilitarán el desarrollo de planes de contingencia y la preparación de la población ante amenazas asociadas a desastres naturales», afirma el profesor Manuel Jesús Castro



LUMI

20 August  
2024

## "Forecasting glacier outburst floods with LUMI"

LUMI, the fastest European supercomputer, features ChEESE's work on its official website, with a focus on modeling rapidly rising glacier outburst floods.

RTVE

26 Jun  
2024

## "UMA researchers develop algorithms capable of predicting maritime catastrophes"

Spanish newspaper Diario Sur covers the work of the University of Malaga in Tsunami-HySEA, an important flagship code in the ChEESE project.

RTVE

20 Jan  
2024

## "Floodable Spain"

ChEESE appears in the documentary on the Spanish TV show "Comando Actualidad" about "La España Inundable" ("Floodable Spain").

## Update: Dissemination Register

### Events



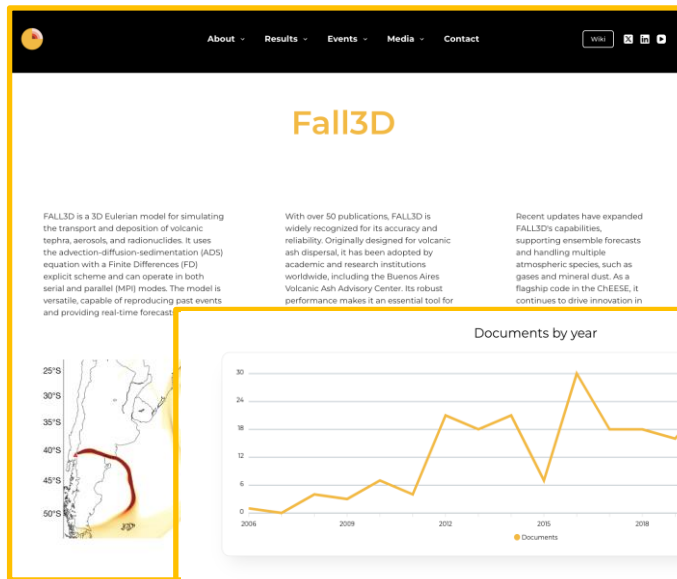
23

### Scientific Publications



19

# Update: ChEESE Website - Codes

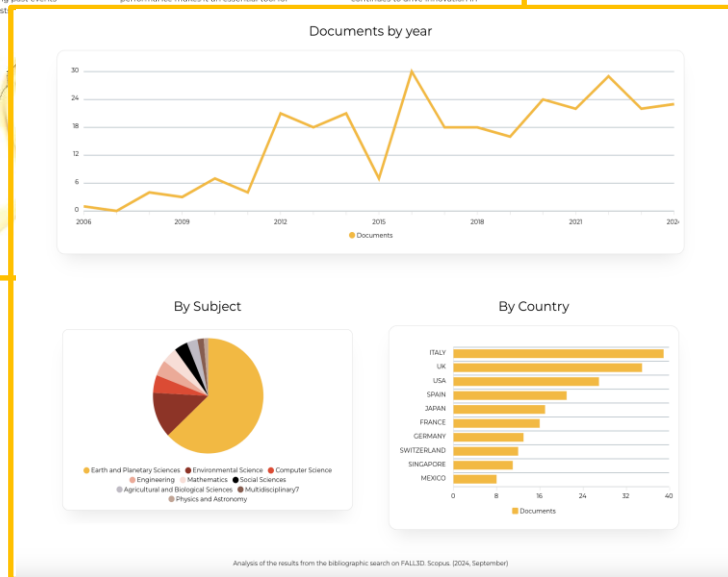


**Fall3D**

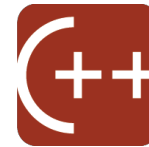
FALL3D is a 3D Eulerian model for simulating the transport and deposition of volcanic tephra, aerosols, and radionuclides. It uses the advection-diffusion-sedimentation (ADS) equation with a Finite Differences (FD) explicit scheme and can operate in both serial and parallel (MPI) modes. The model is versatile, capable of reproducing past events and providing real-time forecast.

With over 50 publications, FALL3D is widely recognized for its accuracy and reliability. Originally designed for volcanic ash dispersal, it has been adopted by academic and research institutions worldwide, including the Buenos Aires Volcanic Ash Advisory Center. Its robust performance makes it an essential tool for

Recent updates have expanded FALL3D's capabilities, supporting ensemble forecasts and handling multiple atmospheric species, such as gases and mineral dust. As a flagship code in the ChEESE, it continues to drive innovation in



SeisSol



SPECfEM



TANDEM



xSHELLS



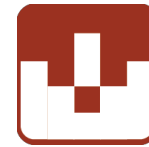
PTatin3D



OpenPDAC



HySEA



LaMEM

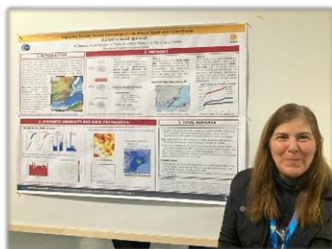
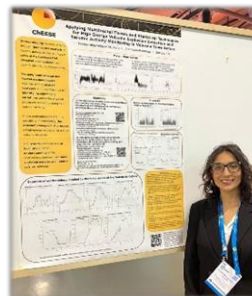
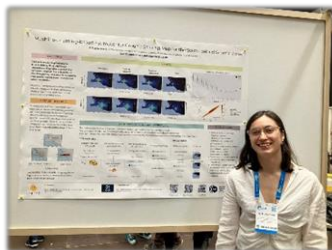
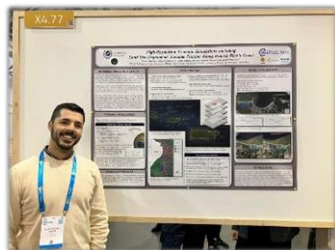


ELMER  
ICE



ExaHyPE

# Events



Memories from 2023 and 2024

# Meet the Researcher series



By showcasing the expertise of ChEESE-2P researchers, the series seeks to position the project as a leading hub for HPC software within the solid earth community and foster engagement with both scientific and broader audiences.



# Training activities



| Date                | Theme                                | Title                                                                                | Type of event    | Location              | Participants |
|---------------------|--------------------------------------|--------------------------------------------------------------------------------------|------------------|-----------------------|--------------|
| 24/03/23            | -                                    | ChEESE training event on EOSCsynergy tools for SQaaS                                 | Internal Webinar | Online                | 29           |
| 16/06/23            | Programming interfaces and languages | Porting to GPU a Fortran code using intrinsic parallelism                            | Webinar          | Online                | 48           |
| 28/06/23            |                                      | OpenCL GPU Programming for HPC Applications                                          | Webinar          | Online                | 55           |
| 7/07/23             |                                      | Kokko: A portable programming library for the exascale era                           | Webinar          | Online                | 25           |
| 20/12/23            |                                      | Device accelerated solvers with PETSc                                                | Webinar          | Online                | 37           |
| 11/03/24 – 14/03/24 | HPC for Geosciences Series           | Computational Volcanology: Modeling Volcanic eruptions using European flagship codes | Training         | BSC, Barcelona, Spain | 16           |

## Training activities



| Date                          | Theme                      | Title                                                                                           | Type of event | Location                            | Participants         |
|-------------------------------|----------------------------|-------------------------------------------------------------------------------------------------|---------------|-------------------------------------|----------------------|
| 25/03/2024<br>-<br>28/03/2024 | HPC for Geosciences Series | Computational Geodynamics: Modeling Geological Processes using European Flagship Codes          | Training      | University of Mainz, Germany        | 17                   |
| 29/04/2024                    | -                          | Good Science in EuroHPC Centers of Excellence: Incorporating Gender Analysis in Research        | Webinar       | Online                              | 50                   |
| 13/05/2024<br>-<br>14/05/2024 | HPC for Geosciences Series | Tsunami and Meteo-Tsunami Modelling                                                             | Training      | Online                              | 46                   |
| 05/11/2024-<br>07/11/2024     | Artificial Intelligence    | Artificial Intelligence and Machine Learning for Geosciences                                    | Training      | Delegació CSIC Catalunya, Barcelona | Registration Open    |
| 10/12/2024                    | -                          | How European projects are developing HPC-based software and services to address natural hazards | Workshop      | Online                              | Planning in progress |

# Training activities



| Date       | Theme                      | Title                       | Type of event | Location | Participants         |
|------------|----------------------------|-----------------------------|---------------|----------|----------------------|
| March/2025 | HPC for Geosciences Series | Computational Seismology I  | Training      | Online   | Planning in progress |
| March/2026 |                            | Computational Seismology II | Training      | Online   | Planning in progress |



Computational Geodynamics – University of Mainz, Germany



Computational Volcanology– Barcelona Supercomputing Center, Spain

# Collaboration with NCCs and CASTIEL2



- Code of the Month Webinars:  
Collaboration with CASTIEL2 to present the FALL3D and OpenPDAC codes.
- Collaboration with CASTIEL2 and NCC Netherlands on the webinar titled “Dos and Don’ts: Interaction with Public Administration & Co.”
- Involvement in events organised by CASTIEL2, as such the Training Coffee-breaks;
- Promotion of conferences, workshops, and fostering partnerships;
- Meetings for task mobilization;
- Dissemination of joint events;
- Organisation of the workshop *'How European projects are developing HPC-based software and services to address natural hazards'*, which will be held in December in partnership with NCC Spain, NCC Turkey, NCC Portugal, CASTIEL, CSIC, BSC, Mitiga Solutions, CoE-ESiWACE3, University of Coimbra, Boğaziçi University Kandilli Observatory and Earthquake Research Institute, and INGV.

## Key Discussion items & other comments



- Success stories -> We need updates on progress or potential newsworthy developments.



- Collaboration on dissemination.



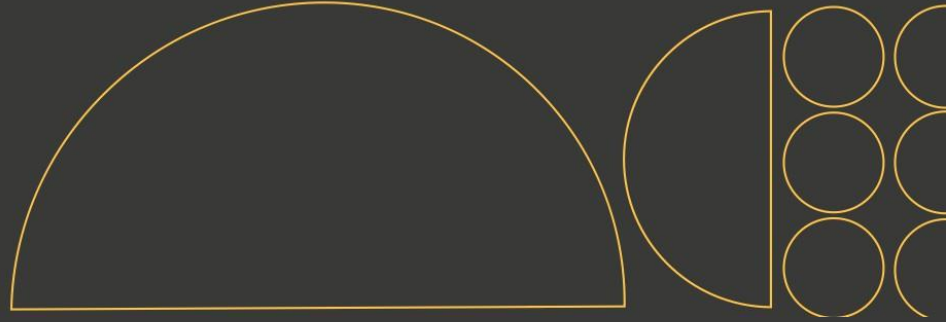
- Please keep us informed and up-to-date on publications.

# What's next?



- Meet the Researcher series
- Trainings:
  - Artificial Intelligence and Machine Learning for Geosciences
  - How European projects are developing HPC-based software and services to address natural hazards
  - Computational Seismology I and II
  - CASTIEL2 ongoing partnerships
  - New general ChEESE “promo” video
  - Code videos

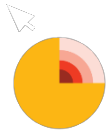
# Thank you!



@cheese-coe



@cheese-coe



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