

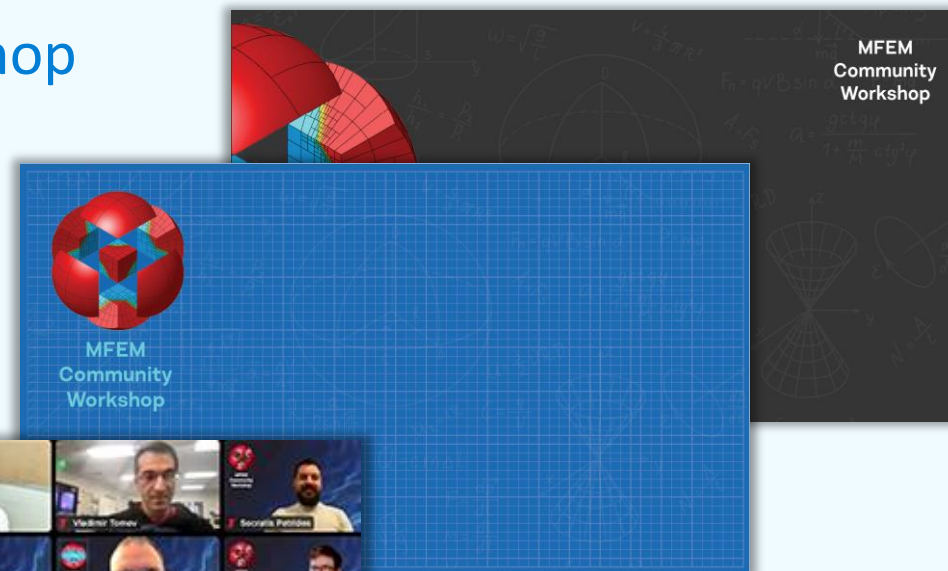
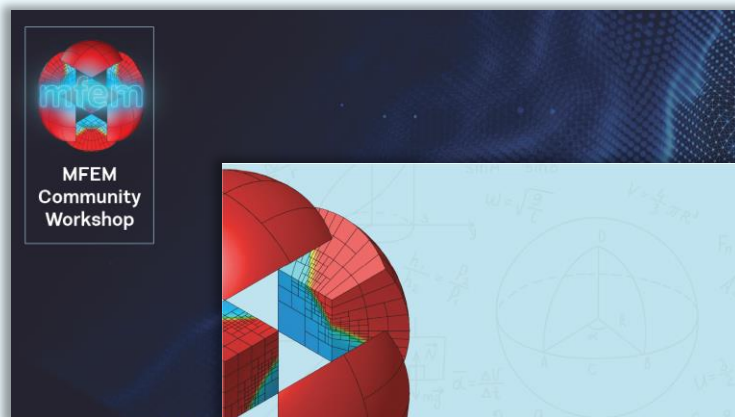
# The next session begins at

# 08:00 PDT 15:00 GMT

- The Zoom session is open all day
- Please turn off your camera and mute your microphone when not speaking
- Disconnect from LLNL VPN
- We're recording the talks and taking screen shots
- Join the conversation in the MFEM Community Slack workspace (link available on [mfem.org/workshop](https://mfem.org/workshop))
- Take the poll on Slack: hybrid or in-person 2024 meeting?
- Post job opportunities to [#mfem-jobs](#) on Slack

# Download a virtual background

[mfem.org/workshop](https://mfem.org/workshop)



# Simulation & visualization contest

- Thanks for submitting your images/videos
- Event organizers have selected a winner
- The winner will receive a t-shirt
- Submissions will be featured at [mfem.org/gallery](https://mfem.org/gallery)

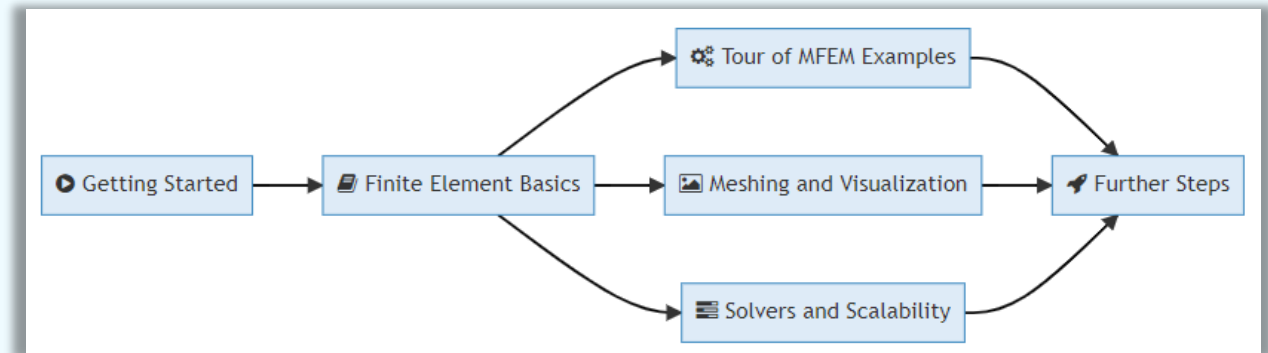
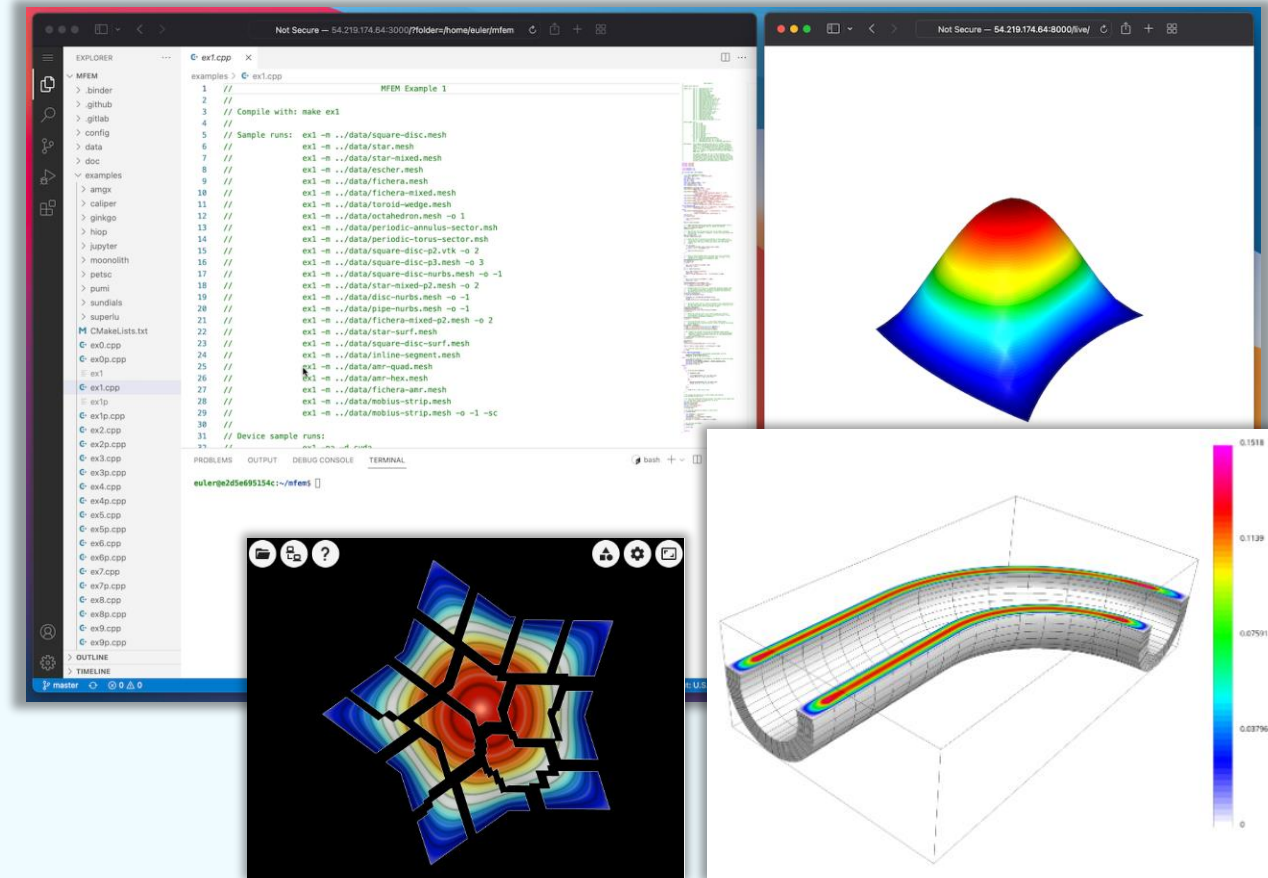


# Let's keep the conversation going

- Docs, examples, news, & more: [mfem.org](https://mfem.org)
- Software: [github.com/mfem](https://github.com/mfem)
- Stay in contact & ask for help: [mfem@llnl.gov](mailto:mfem@llnl.gov) or [github.com/mfem/mfem/discussions](https://github.com/mfem/mfem/discussions)
- Become an MFEM reviewer! We need help with reviewing contributions as the community grows.

# AWS tutorial

- Available at [mfem.org/tutorial](https://mfem.org/tutorial)
- No previous experience necessary!
- Go at your own pace in an Amazon EC2 instance or local Docker container
- Explore FEM basics, meshing, viz, and scalable solvers



# FEM@LLNL seminar series

- Approximately monthly via WebEx (21 speakers so far!)
- YouTube playlist
- View the queue and sign up for notifications: [mfem.org/seminar](https://mfem.org/seminar) (the next seminar is Nov. 7)
- Interested in giving a seminar? [mfem@llnl.gov](mailto:mfem@llnl.gov)

The screenshot shows the website for the FEM@LLNL Seminar Series. At the top, there is a navigation bar with links for MFEM, Features, Examples, Documentation, Community, Gallery, and Download, along with a GitHub icon. The main heading is "FEM@LLNL Seminar Series". Below this, a paragraph announces a new seminar series starting in 2022, focusing on finite element research and applications. A "Sign-Up" section with an envelope icon includes a link to a sign-up form. A "Next Talk" section features a profile picture of Ben Southworth, his affiliation with Los Alamos National Laboratory, the title of his talk, and the date and time: 9am PDT, October 17, 2023. On the right side, there is a sidebar with links for "FEM@LLNL Seminar Series", "Sign-Up", "Next Talk", "Previous Talks", and "Future Talks".

The screenshot shows a YouTube playlist titled "FEM@LLNL Seminar Series" from the channel "Livermore Lab Events". The playlist contains 21 videos. The first five videos are listed with their titles, view counts, and upload dates. Each video thumbnail includes a duration timer. The videos are: 1. "FEM@LLNL | The Shifted Boundary Method: An Immersed Approach for Computational Mechanics" (1:07:08, 340 views, 1 year ago); 2. "FEM@LLNL | An Overview of ExaConstit and Its Use in the ExaAM Project" (1:02:42, 353 views, 1 year ago); 3. "FEM@LLNL | Axisymmetric MFEM-Based Solvers for Compressible Navier-Stokes Equations & Other Problems" (55:50, 425 views, 1 year ago); 4. "FEM@LLNL | Unifying the Analysis of Geometric Decomposition in FECC" (1:14:55, 220 views, 1 year ago); 5. "FEM@LLNL | Space-Time Hybridizable Discontinuous Galerkin with MFEM" (59:45, 542 views, 1 year ago). The playlist interface includes a "Play all" button and a "Shuffle" button.

# Welcome to the Third Annual MFEM Community Workshop

October 26, 2023  
[mfem.org/workshop](https://mfem.org/workshop)

## Organizers



Aaron Fisher



Tzanio Kolev



Will Pazner



Socratis Petrides



Milan Holec



Ketan Mittal



Vladimir Tomov

# Interacting with the workshop



- We will be recording the workshop and posting videos of the talks.
- Please keep your mic muted during the talks.
- During the talks you can ask questions in the Zoom chat.
- Leave your camera off unless you are speaking (except for the upcoming group photo)
- Side conversations will be happening in the workshop slack channel.  
(<https://mfemworkshop.slack.com>)
- If you are having trouble with the slack channel, ask for help in the chat.



# Certificate of Participation



Ask Holly Auten on Slack if you need one!

# Agenda (mfem.org/workshop)

8:00-8:20

**Welcome & Overview**

**Aaron Fisher** (LLNL)

8:20-8:40

**The State of MFEM**

**Tzanio Kolev** (LLNL)

8:40-9:00

**Recent Developments**

**Veselin Dobrev** (LLNL)

9:00-9:20

**Break**

Discussions on [Slack](#)

9:20-10:20

**Session I**  
(20 mins each)

**Sebastian Grimberg** (Amazon  
Web Services)

Chair:  
**Will Pazner**

**Jacob Lotz** (Delft University of  
Technology)

**Boyan Lazarov** (LLNL)

10:20-10:40

**Break & Group Photo**

# Agenda

10:40-11:40

## Session II – Student talks (5 mins each)

Chair:  
**Milan Holec**

11:40-12:00

**Break**

12:00-1:00

## Session III (20 mins each)

Chair:  
**Tzanio Kolev**

1:00-1:20

**Break**

**Shani Martinez Weissberg** (Tel Aviv University)

**Alejandro Muñoz** (Universidad de Granada)

**Paul Moujaes** (TU-Dortmund)

**Bill Ellis** (UKAEA)

**Alexander Mote** (Oregon State University)

**Amit Rotem** (Virginia Tech)

**Josiah Brown** (Relogic Research)

**Mike Pozulp** (LLNL)

Discussions on [Slack](#)

**Syun'ichi Shiraiwa** (PPPL)

**Tamas Horvath** (Oakland University)

**Yohann Dudouit** (LLNL)

Discussions on [Slack](#)

# Agenda

1:20-2:20

**Session IV**  
(20 mins each)

Chair:  
**Ketan Mittal**

**Zhang Chunyu** (Sun Yat-Sen  
University)

**Eric Chin** (LLNL)

**Milan Holec** (LLNL)

2:20-2:40

**Break**

Discussions on [Slack](#)

2:40-3:00

**Wrap-up & Contest Winners**

**Aaron Fisher** (LLNL)

3:00-4:00

**Q&A Session**

**MFEM team** available on Zoom + Slack

# Selected Survey Results



# 259 Participants from 35 countries and 157 organizations

## National Laboratories

Army Research Laboratory
Helmholtz-Zentrum Dresden-Rossendorf
Helmholtz-Zentrum Hereon
Idaho National Laboratory
Inria Paris
Laboratório Nacional de Luz Síncrotron
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Naval Nuclear Laboratory
Princeton Plasma Physics Laboratory
Simula Research Laboratory
UK Atomic Energy Authority
VTT Technical Research Centre of Finland

## Industry

Airbus India
Amazon Web Services
Autodesk
BS&A
Cysca Technologies
Divergent 3D
HPE
IBM Research
IERUS Technologies
Innomerics S.L.
Intact Solutions
Kappa Engineering
KiCad
Littelfuse Inc.
Omnigence Corporation
Raiden Numerics LLC
ReLogic Research
Repsol
Synopsys
Synthetik Applied Technologies
Tau Motors
WelSimulation LLC
X-ScaleSolutions
Xcimer Energy Inc.

## Universities

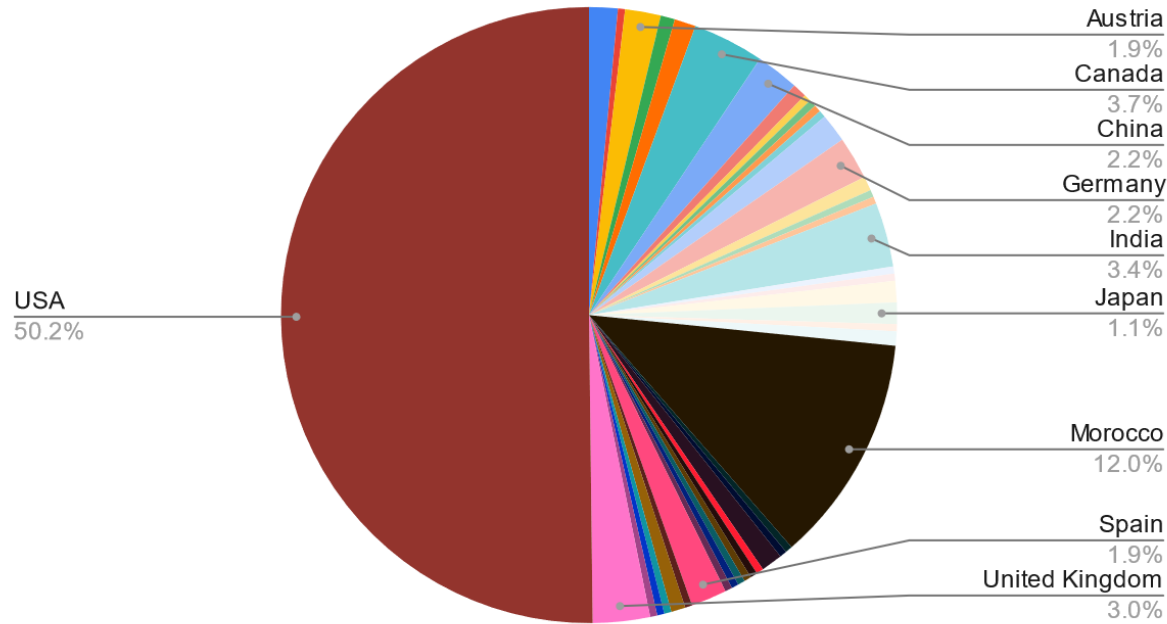
Abdelmalek Essaadi University
ASSMS, GC University, Lahore
Badji Mokhtar university
Brown University
Cadi Ayyad University, Marrakesh
Charles University Prague
Chouaib Doukkali university Eljadida
Clarkson University
Delft University of Technology
East China Normal University
Echahid Cheikh Larbi Tebessi University
Emory University
EPFL
ETH Zurich
Faculté des sciences dhar elmhraz Fès
Faculté poly Nador
Faculty of science and technology of Tangier
Faculty of Sciences, Mohammed V University in Rabat
Sultan Moulay Slimane University
Georgia Institute of Technology
Graz University of Technology
Hassan II University of Casablanca
Hasselt University
HTW Berlin
Ibn Zohr University
IIT Goa
IIT Kharagpur
IIT Tirupati
Imperial College London
India Institute of Technology Guwahati
Indian Institute of Science
Isfahan University of Technology
Johannes Kepler University
Johns Hopkins University Applied Physics Lab (JHU/APL)
King Saud University

KTH Royal Institute of Technology
La Faculté des sciences Tetoan
La Rochelle university
LSU
Makhbar
Martinos Center for Biomedical Imaging, Boston
Massachusetts Institute of Technology
Michigan State University
Mohamed 6 Polytechnic University
Mohamed 1 Oujda
Mohammed Premier University
National University of Engineering
NIT Trichy
North Carolina State University
Northern Illinois University
Norwegian University of Science and Technology (NTNU), Trondheim
Oakland University
Obafemi Awolowo university
Oregon State University
Portland State University
Rensselaer Polytechnic Institute
RICAM
Simon Fraser University
Sun Yat-Sen University
Tel Aviv University
Texas Tech University
The Hong Kong University of Science and Technology
The Pennsylvania State University
The University of British Columbia
The University of Memphis
The University of Texas at El Paso
The University of Western Australia
Tokyo Metropolitan University
TU Dortmund
TU Wien

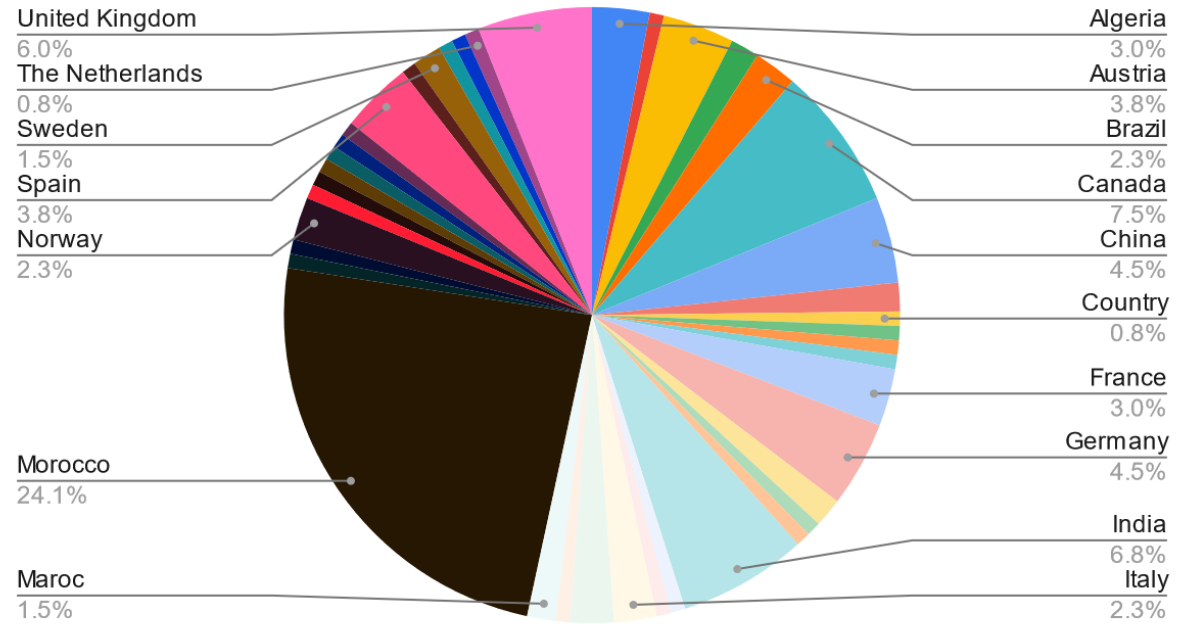
UC Berkeley
UM V
UNICAMP
Unierity of Cape Coast
UNIST
Universidad de Granada
Universidad Nacional de Colombia
Universidade da Coruña
University Hassan first, laboratory misi, Settat, Morocco
University Moulay ismail Meknes
University of Antwerp
University of Belgrad
University of British Columbia
University of California San Diego
University of California, Davis
University of Cape Coast
University of Colorado Boulder
University of Eloued
University of Glasgow
University of Houston
University of Illinois at Urbana-Champaign
University of Ioannina
University of L'Aquila
University of Massachusetts Dartmouth
University of Memphis
University of Notre Dame
University of Oslo
University of South Florida
University of Texas at Austin
University of Waterloo
University of Wisconsin-Madison
University Sidi Mohammed Ben Abdellah
University of Eloued
UQAM
Utah State University
Virginia Tech
Zhejiang University

# Participant countries

Participant country

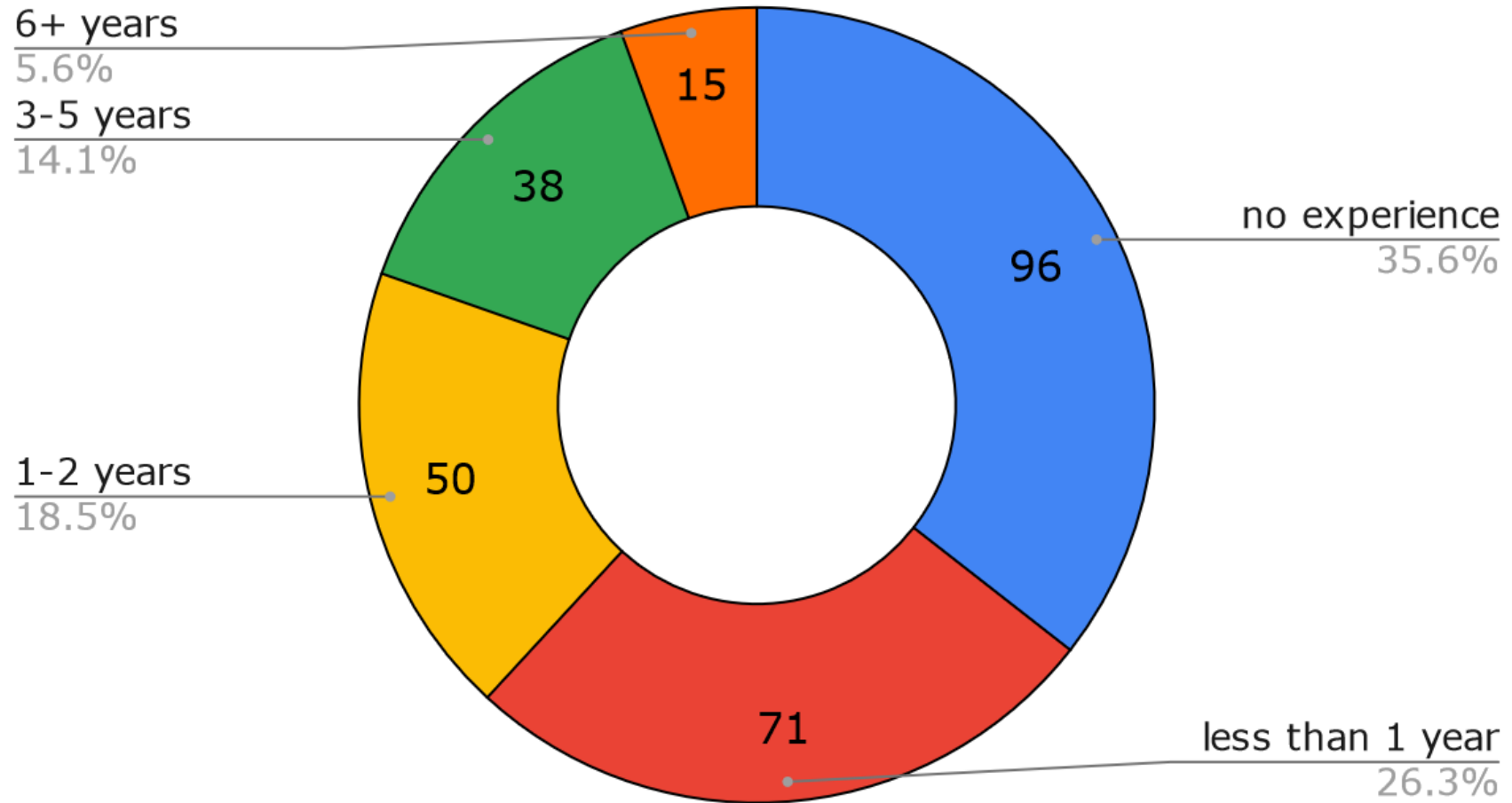


Participant country (USA removed)



# Years of experience with MFEM

## Experience with MFEM





# MFEM Resources



# Curious about using MFEM mfem.org (<https://mfem.org>)

MFEM

Features

Examples ▾

Documentation ▾

Community ▾

Gallery

Download

 GitHub

Example Codes

Electromagnetics

Fluid Dynamics

Meshing

Automatic Differentiation

Tools

Toys

High-order multi-material hydrodynamics in the [BLAST](#) code

MFEM is a *free, lightweight, scalable* C++ library for finite element methods.

## Features

- Arbitrary high-order finite element [meshes](#) and [spaces](#).
- [Wide variety](#) of finite element discretization approaches.
- Conforming and nonconforming [adaptive mesh refinement](#).
- Scalable from laptops to [GPU-accelerated](#) supercomputers.
- ... and [many more](#).

MFEM is used in many projects, including [BLAST](#), [Cardioid](#), [VisIt](#), [RF-SciDAC](#), [FASTMath](#), [xSDK](#), and [CEED](#) in the [Exascale Computing Project](#). See also our [Gallery](#), [Publications](#), [Videos](#) and [News](#) pages.

## News

Oct 22, 2022 [Version 4.5 released](#).

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Aug 15, 2022 [MFEM tutorial](#) on AWS.

Jan 20, 2022 [FEM@LLNL seminar series](#) starting.

## Latest Release

[New features](#) | [Examples](#) | [Code documentation](#) | [Sources](#)

[Download mfem-4.5.tgz](#)

[Older releases](#) | [Python wrapper](#) | [launch binder](#)

## Documentation

[Building MFEM](#) | [Getting Started](#) | [Finite Elements](#) | [Performance](#)

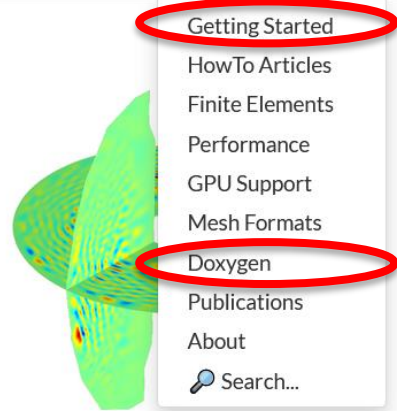
New users should start by examining the [example codes](#).

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## Contact

Use the GitHub [issue tracker](#) to report [bugs](#) or post [questions](#) or [comments](#).  
See the [About](#) page for citation information.

# Getting started on mfem.org (<https://mfem.org>)



Electromagnetic wave propagation in the NSTX-U tokamak

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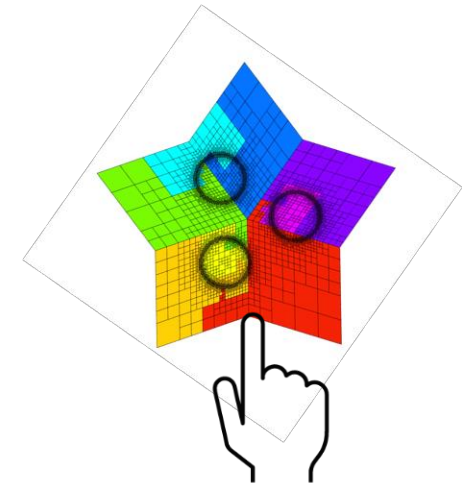
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# MFEM on Github (https://github.com/mfem/mfem)



mfem / mfem Public

Notifications Fork 464 Star 1.4k

Code Issues 102 Pull requests 153 Discussions Actions Projects 3 Security Insights

master 505 branches 28 tags

Go to file Code About

tzanio Merge pull request #3930 fr... ✓ b

- .binder More small adjustments
- .github Pin version of easimon/
- .gitlab Update the GitLab CI cc
- config Merge pull request #37
- data Add 1D meshes embed
- doc Update version numbers to
- examples fix typos

idaholab / moose Star 1.3k

dealii / dealii Star 1.2k

ElmerCSC / elmerfem Star 995

Code Issues Pull requests

Official git repository of Elmer FEM software

mpi parallel-computing fem finite-elements multiphysics electromagnetics acoustics

finite-element-methods fluid-mechanics structural-mechanics elmergui elmersolver elmergrid glaciology

elmerice

# MFEM on Github (https://github.com/mfem)



## MFEM

a lightweight, general, scalable C++ library for finite element methods

Lawrence Livermore National Laborat... <https://mfem.org> Verified

- Overview
- Repositories 10
- Packages
- People 456
- Teams 6**
- Projects 2

### Pinned

<b>mfem</b> <span>Public</span> Lightweight, general, scalable C++ library for finite element methods C++ 810 300	<b>PyMFEM</b> <span>Public</span> Python wrapper for MFEM C++ 66 28	<b>data</b> <span>Public</span> Additional (large) datafiles for MFEM 2
---	---	---

### Repositories

Find a repository... Type Language Sort New

**mfem** Public  
Lightweight, general, scalable C++ library for finite element methods

C++ 810 BSD-3-Clause 300 45 (2 issues need help) 103 Updated 3 minutes ago

### People



[View all](#)

### Top languages

- C++
- Python
- HTML
- Less

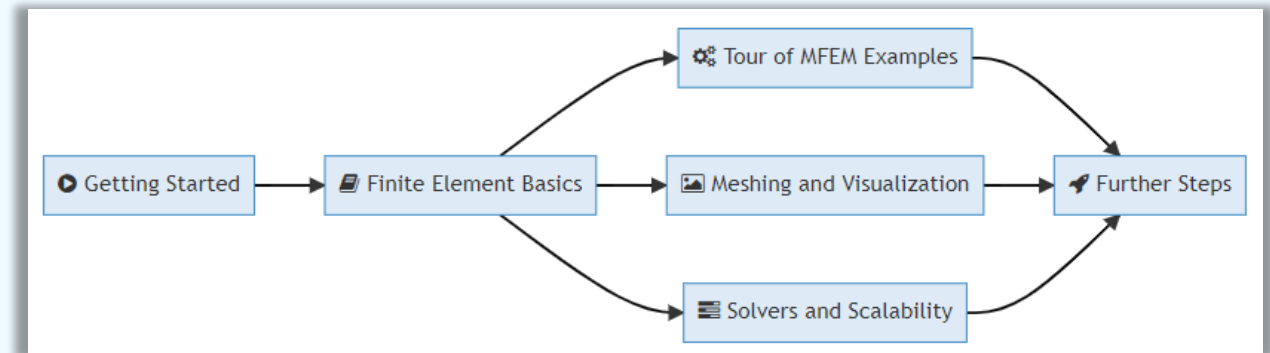
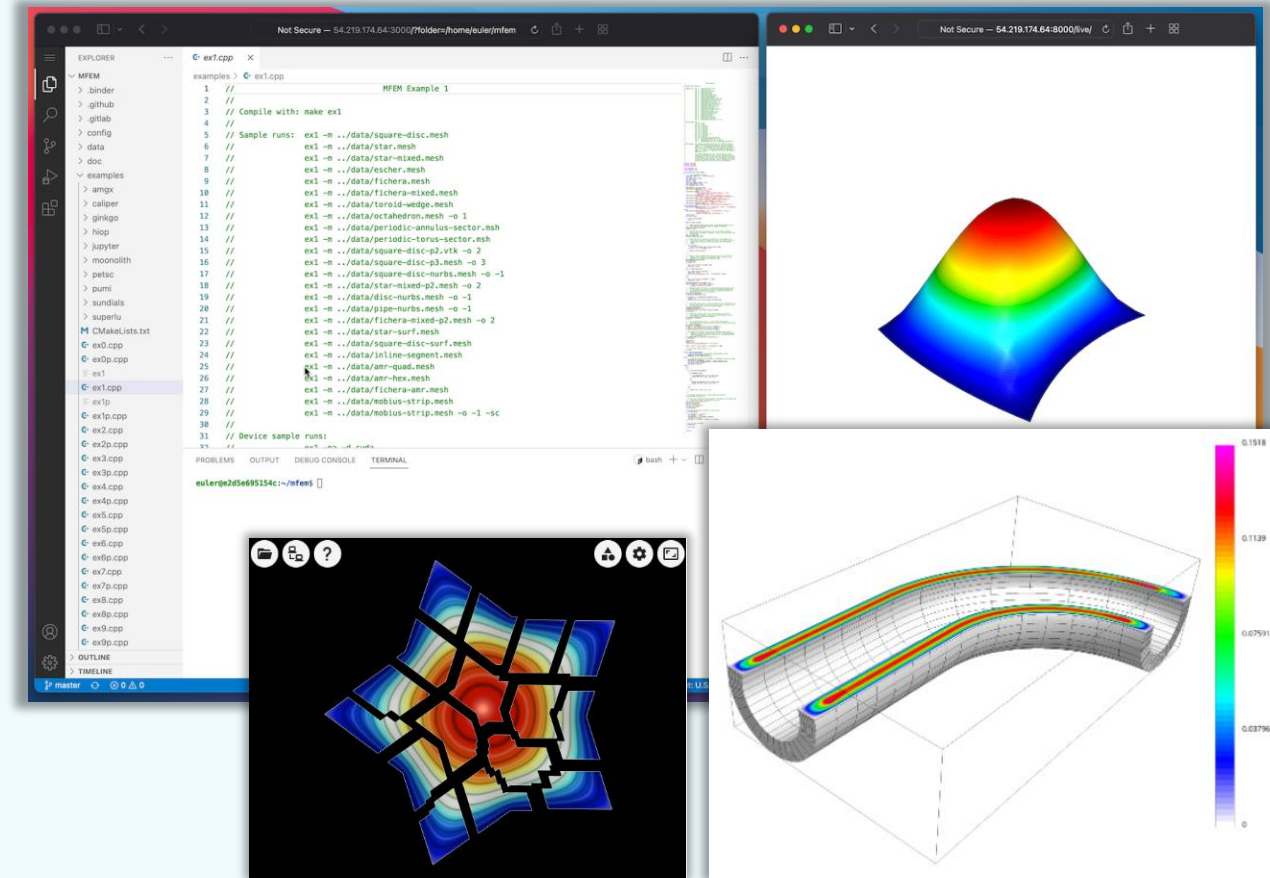
### Most used topics

[Manage](#)

- fem
- scientific-computing

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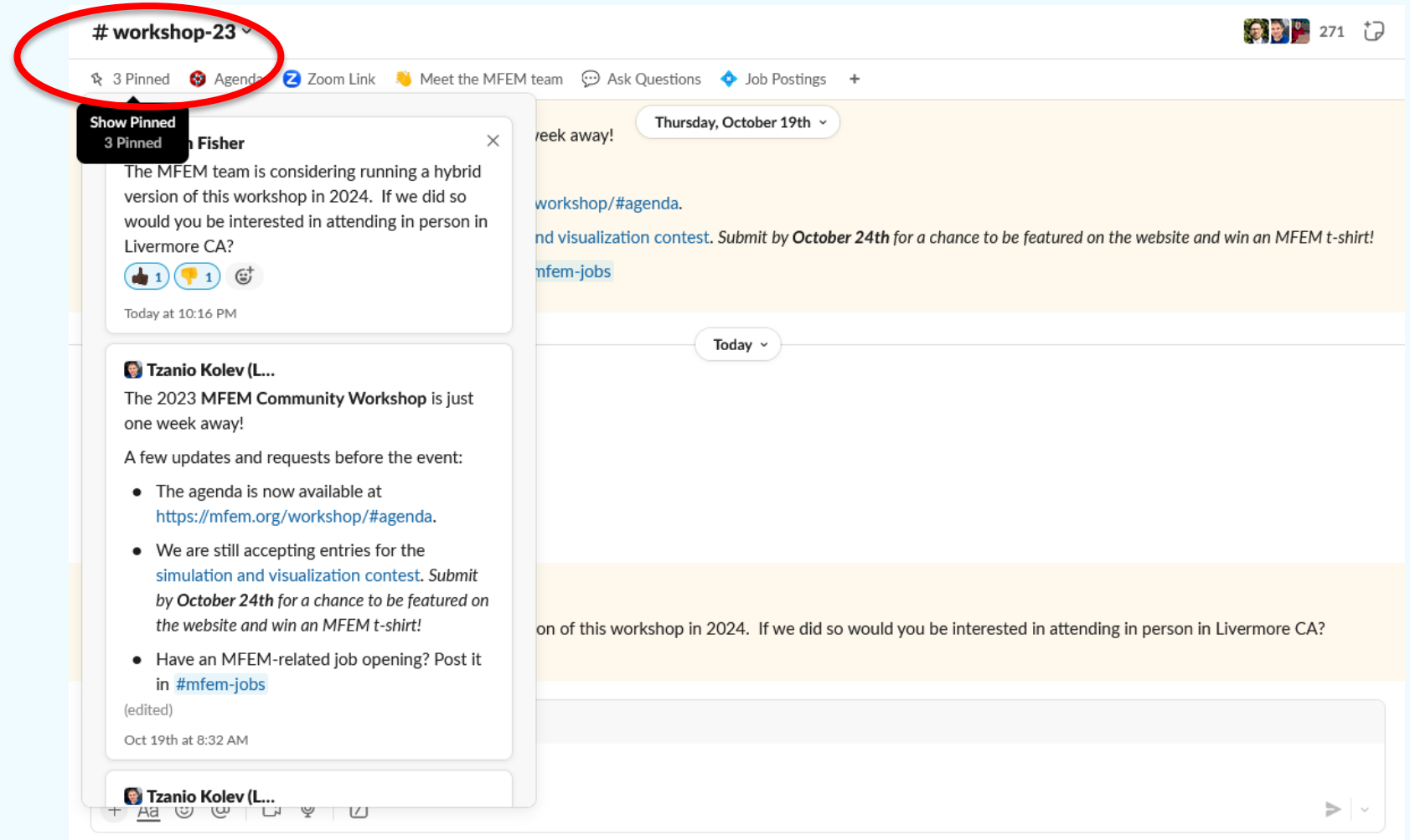
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Video Number	Title	Views	Time Ago
1	FEM@LLNL   The Shifted Boundary Method: An Immersed Approach for Computational Mechanics	340	1 year ago
2	FEM@LLNL   An Overview of ExaConstit and Its Use in the ExaAM Project	353	1 year ago
3	FEM@LLNL   Axisymmetric MFEM-Based Solvers for Compressible Navier-Stokes Equations & Other Problems	425	1 year ago
4	FEM@LLNL   Unifying the Analysis of Geometric Decomposition in FECC	220	1 year ago
5	FEM@LLNL   Space-Time Hybridizable Discontinuous Galerkin with MFEM	542	1 year ago

# Participate in our 2024 Workshop poll!

- Find it pinned on the Workshop slack: [mfemworkshop.slack.com](https://mfemworkshop.slack.com)





# Call for Reviewers!

- The MFEM team is looking for more code reviewers
- If you are interested contact us via the Workshop slack: [mfemworkshop.slack.com](https://mfemworkshop.slack.com)

Modify TransformedCoefficient to support std::function #3928 New issue

Open jandrej wants to merge 2 commits into master from transformed-coeff

Conversation 4 Commits 2 Checks 26 Files changed 2 +12 -10

jandrej commented 2 weeks ago • edited by tzanio

Enables the use of `std::function` to `TransformedCoefficient`.

Is it OK to use `const` on the arguments?

PR	Author	Editor	Reviewers	Assignment	Approval	Merge
<a href="#">#3928</a>	@jandrej	@tzanio	@sebastiangrimberg + @TobiasDuswald	10/17/23	due 10/31/23	due 11/7/23

PR Checklist

- modified `TransformedCoefficient` to support `std::function` ✓ 89fa720
- jandrej added the `ready-for-review` label 2 weeks ago
- remove `const` from parameters in signature ✓ b504bfa

tzanio commented last week

Reviewers

- sebastiangrimberg
- TobiasDuswald

At least 1 approving review is required to merge this pull request.

Assignees

- tzanio
- sebastiangrimberg
- TobiasDuswald

Labels

- fem
- in-review
- minor

Projects

- Pull Requests
- Review Now

