Gridap

Welcome to Gridap's workshop at ANU!

Simulating PDEs using finite elements in Julia

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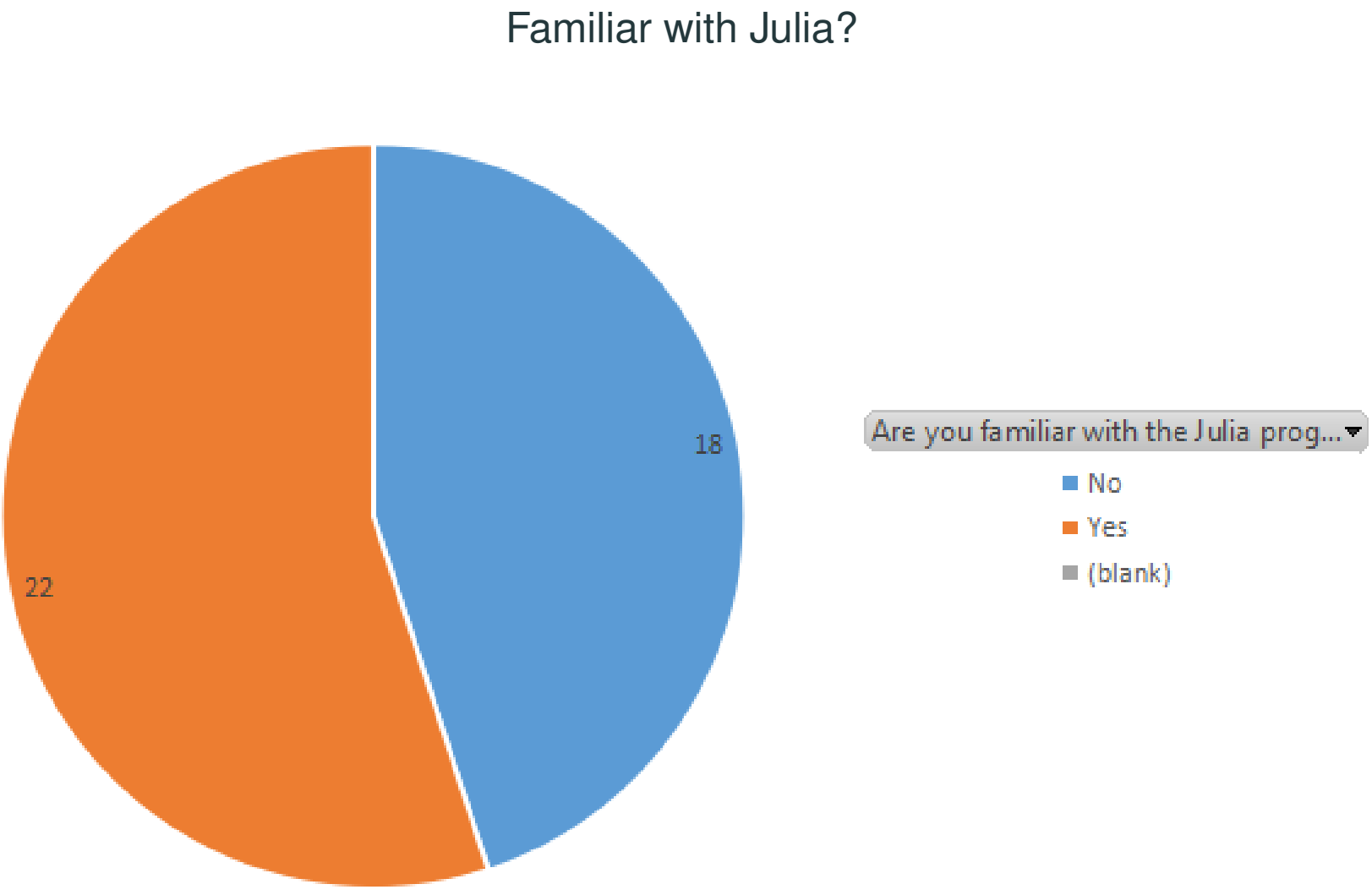
School of Computing, Australian National University, Canberra, 28th Nov 2023

About us - The instructors

- Prof. Santiago Badia
  - Professor of Computational Mathematics at Monash University
  - Gridap for teaching at Monash - *MTH3340 Numerical Methods for PDEs*
- Dr. Alberto F. Martin
  - Senior Research Fellow in Computational Science & Engineering at ANU
- Mr. Jordi Manyer
  - PhD candidate in Computational Mathematics at Monash University

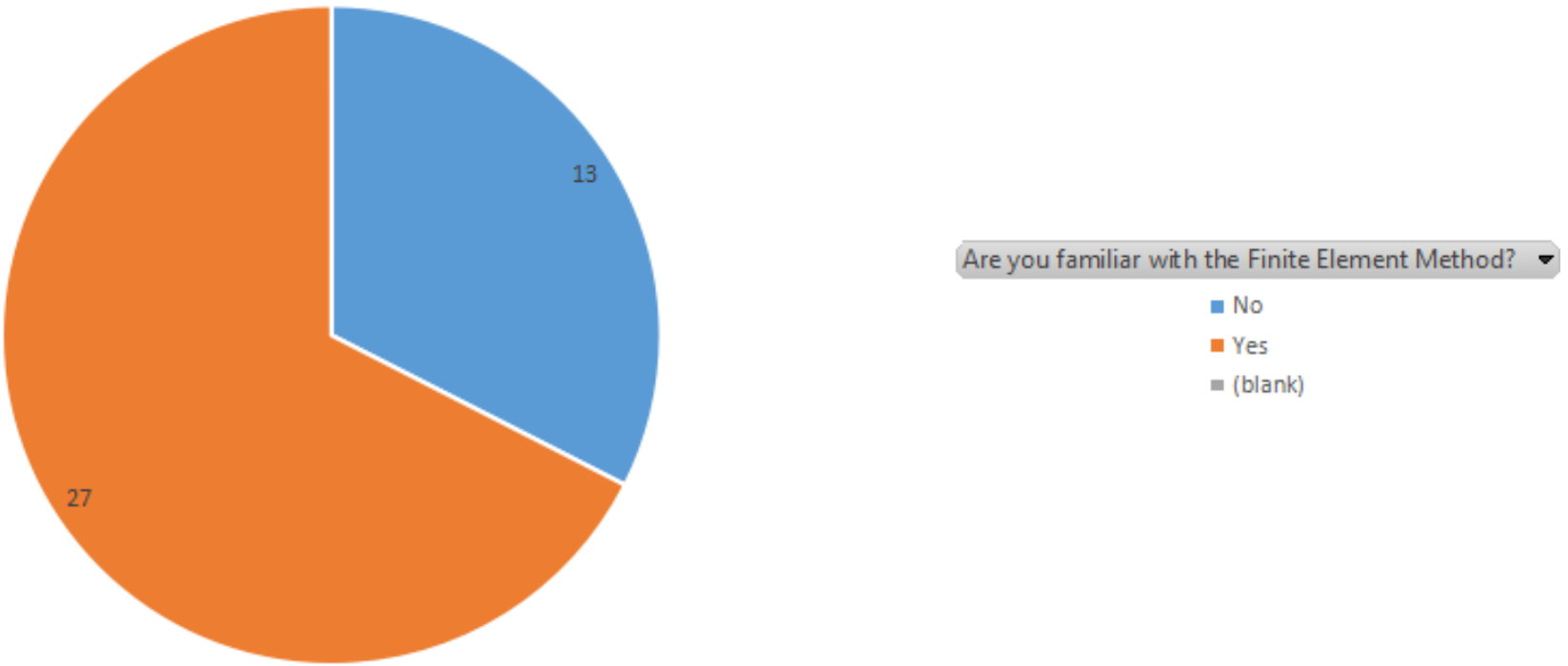
We develop Gridap (along with other collaborators from EU) mainly as a tool for state-of-the-art R&D in FEM and large-scale scalable solvers for PDEs

About you - Survey results (I)



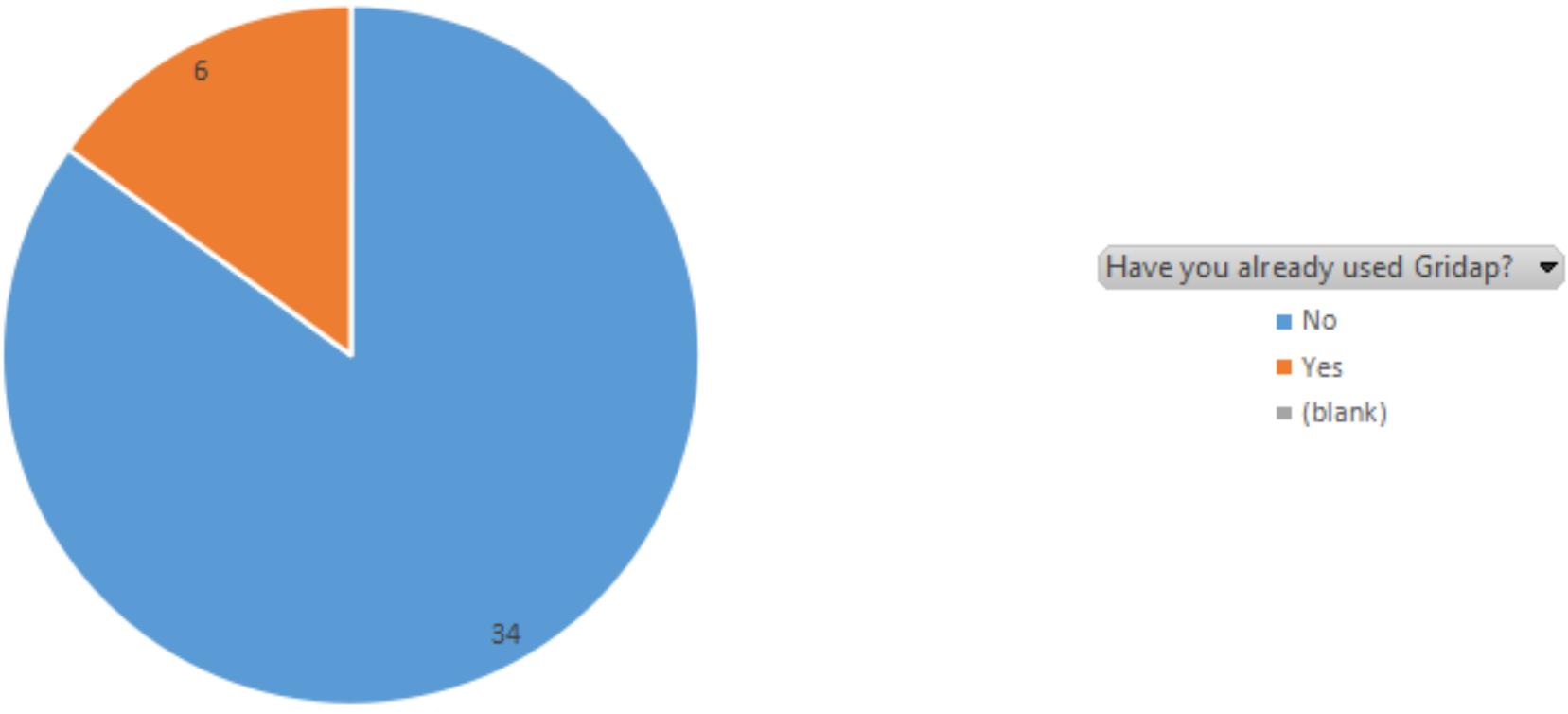
About you - Survey results (II)

Familiar with FEM?

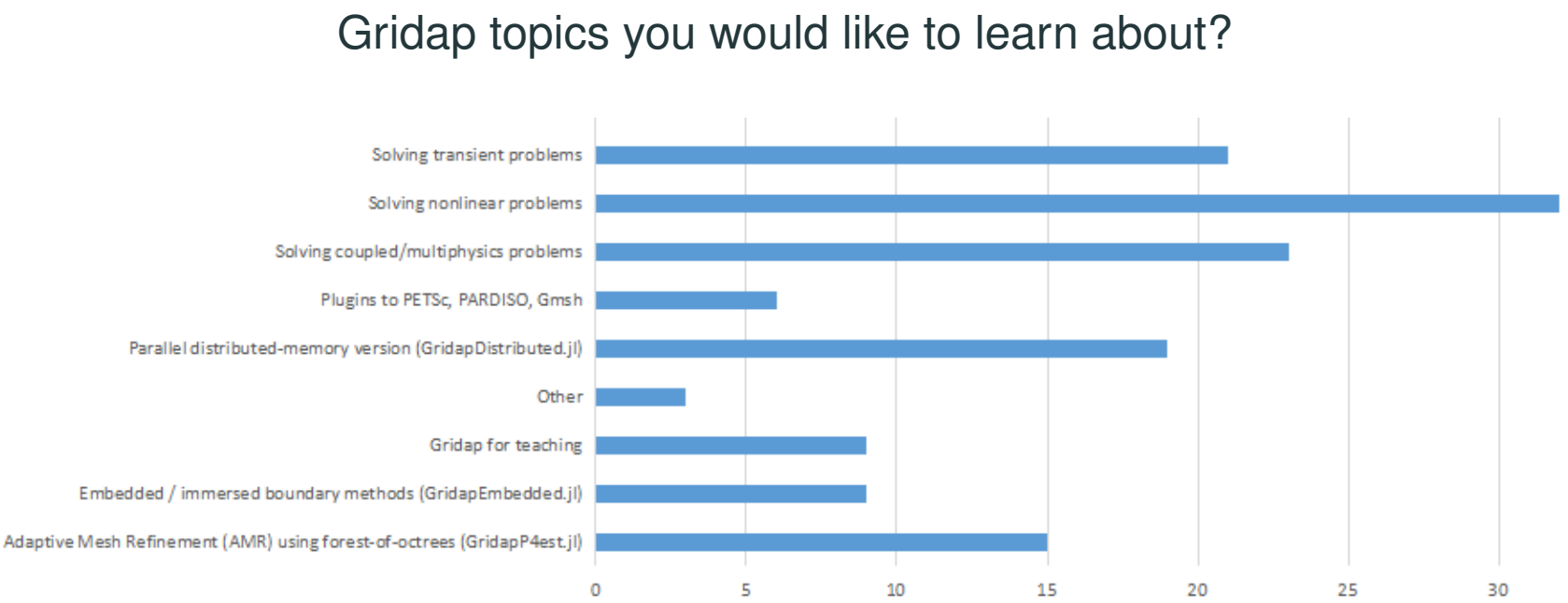


About you - Survey results (III)

Have used Gridap before?



About you - Survey results (IV)



Schedule - Day 1

Day 1 (28th, Nov)

- 9:00-9:10. Opening by Prof. Amanda S. Barnard
- 9:10-9:20. Intro to workshop
- 9:20-10:00. Overview of Julia
- 10:00-10:20. Coffee break
- 10:20-11:20. Intro to FEM
- 11:20-12:00. Tutorial 1: Poisson equation
- 12:00-12:50. Lunch break
- 12:50-13:50. Exercise 1: Linear Elasticity
- 13:50-14:20. Tutorial 2: p-Laplacian
- 14:20-14:40. Tutorial 3: Heat Equation
- 14:40-15:10. Coffee Break
- 15:10-15:40. Tutorial 4: Stokes problem
- 15:40-17:00. Exercise 2: Navier-Stokes equations

You will work in your laptop

Schedule - Day 2 (Tentative)

Day 2 (29th, Nov) - Tentative

- 9:00-10:00. Exercise 3: Transient Navier-Stokes problem
- 10:00-10:20. Coffee Break
- 10:20-11:20. Parallel distributed-memory computing with Gridap ecosystem
- 11:20-12:00. Parallel Transient Navier-Stokes
- 12:00-12:50. Lunch break
- 12:50-14:00. Introduction to Gadi and our first HPC cluster computations
- 14:00-14:30. Coffee break
- 14:30-16:00. Tutorial 6: Darcy + parallel distributed-memory AMR
- 16:00-17:00. Q&A and discussion with developers

You will work in your laptop and `Gadi@NCI` (ARE)

Resources/Materials

- Workshop's website available here
- GitHub's repo with slides, tutorials, exercises, scripts, etc. available here