

# MUMPS User Days

22-23 June 2023

LIP6, Sorbonne Université

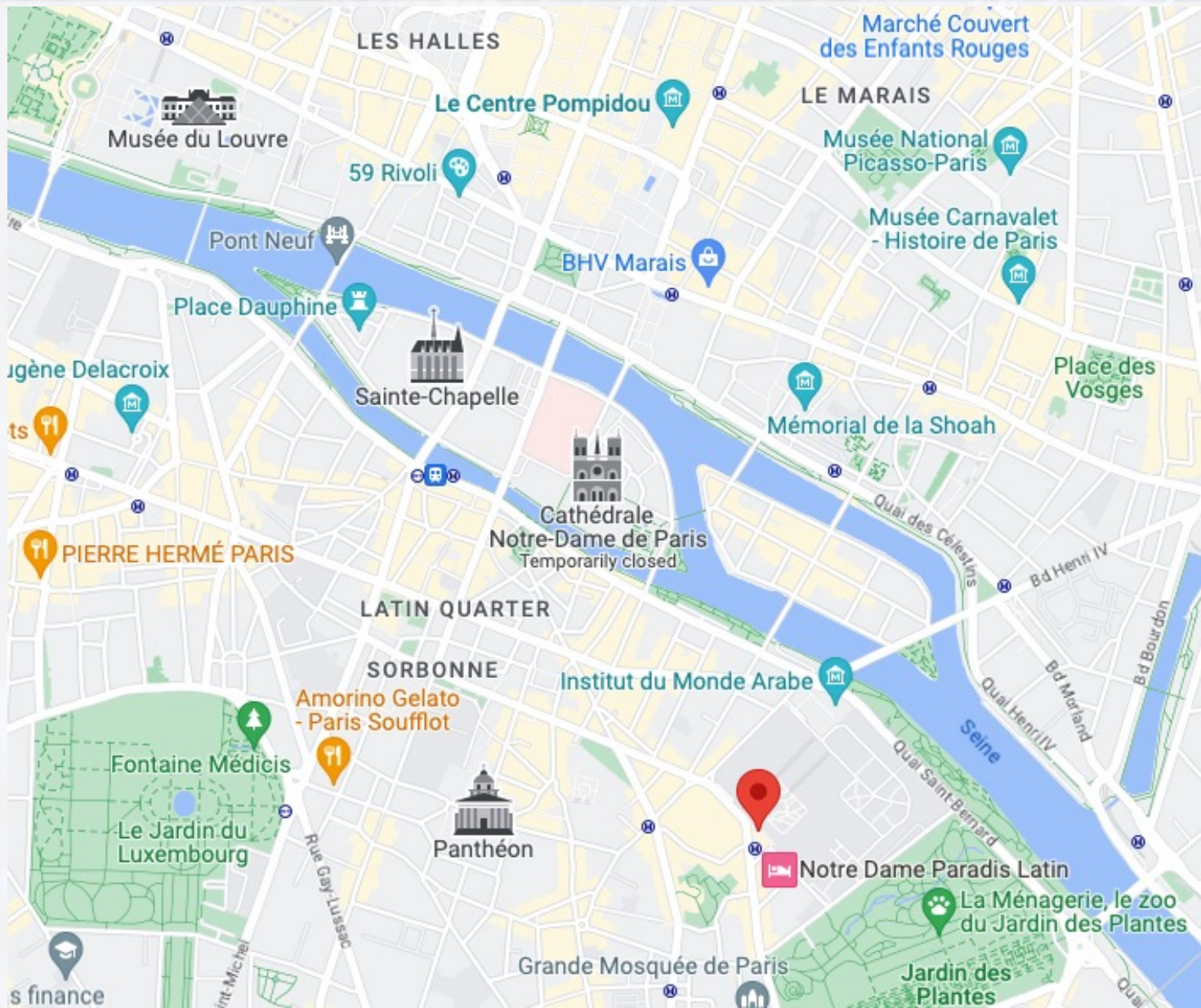


MUMPS  
Technologies





# In the center of the « quartier latin »





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In the center of the « quartier latin »



# LIP6 Institute: a Joint Research Unit

One of the largest Computer Science Institute in France



## University with Intensive Research

55 600 students (incl. 4 500 Ph.D.)

3 400 professors

3 000 researchers (CNRS, Inria, Inserm)

More than 100 research structures

## Three faculties

Science & Engineering

Medicine

Humanities



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55 600 students (incl. 4 500 Ph.D.)

3 400 professors

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More than 100 research structures

## National Center for Research

33 000 researchers, engineers & technicians

1 400 laboratories

## Three faculties

Science & Engineering

Medicine

Humanities

## Ten institutes

*Information Sciences and Technologies*  
Biological sciences, Chemistry, Ecology and Environment, Humanities and Social Sciences, Engineering and Systems Sciences, Mathematical Sciences and their Interactions, Physics, Nuclear and Particle Physics, Earth Sciences and Astronomy

# Computer Science @ LIP6

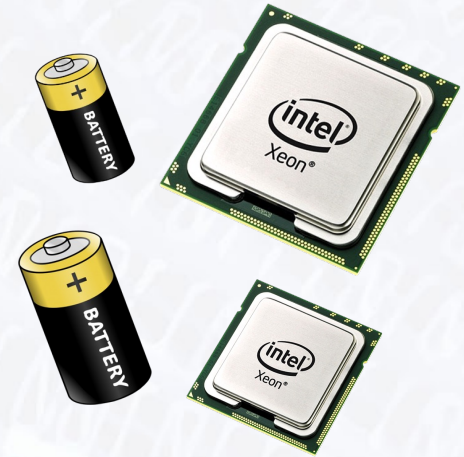
## Four research axes

### Theory and mathematics of computing

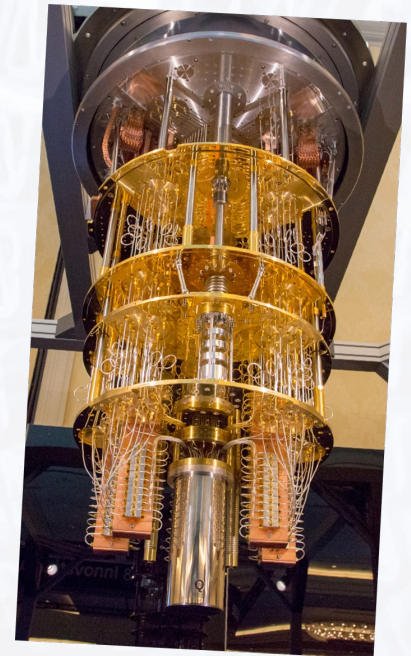
*Some examples:*

*Multi-criteria decisions — Quantum computing*

Energy / Speed



Quantum networks





# Computer Science @ LIP6

## Four research axes

### Theory and mathematics of computing

*Some examples:*

*Multi-criteria decisions — Quantum computing*

### Safety, security and reliability

*Some examples:*

*Cryptographic systems — High Critical Software*

Post-Quantum



2018 ATOS price won @ LIP6

Life-critical



Fast and reliable computing



# Computer Science @ LIP6

## Four research axes

### Theory and mathematics of computing

*Some examples:*

*Multi-criteria decisions — Quantum computing*

### Safety, security and reliability

*Some examples:*

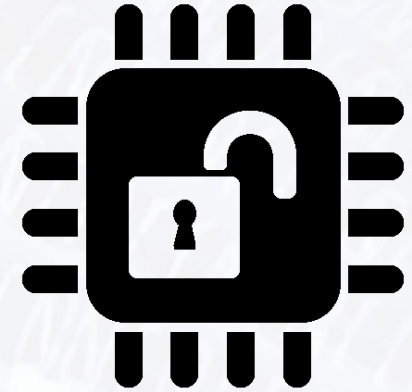
*Cryptographic systems — High Critical Software*

### Architecture, Systems, and Networks

*Some examples:*

*Open Hardware — Cloud Computing*

Security issue



Secure storage





# Computer Science @ LIP6

## Four research axes

### Theory and mathematics of computing

*Some examples:*

*Multi-criteria decisions — Quantum computing*

### Safety, security and reliability

*Some examples:*

*Cryptographic systems — High Critical Software*

### Architecture, Systems, and Networks

*Some examples:*

*Open Hardware — Cloud Computing*

### Artificial intelligence and data science

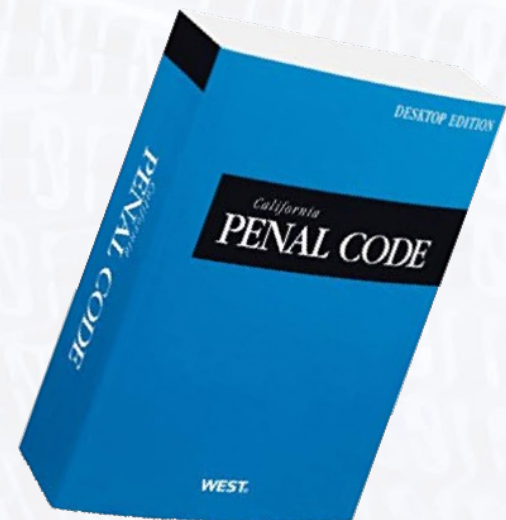
*Some examples:*

*Big data, deep learning, computer-assisted human learning, automated reasoning*

Assisted Surgery



Simulating Laws





# 20 teams across 4 research axes

ACASA	ALMASTY	ALSOC	APR	BD	CIAN	ComplexNetworks	DECISION	DELYS <sup>2</sup>	LFI	MOCAH	MoVe	NPA	PEQUAN	Phare	PolSys	QI	RO	SMA	SYEL
<b>«Artificial Intelligence &amp; Data Science» (AID)</b>																			
●				●	◆	●	●	◆	●	●		◆				◆	◆	●	◆
<b>« Architectures, Systems and Networks» (ASN)</b>																			
		●	◆	●	●	◆		●			◆	●		●		●	◆	◆	●
<b>«Safety, Security and Reliability» (SSR)</b>																			
	●	●	●		●	◆		●			●	●	●	●	●	●			◆
<b>«Theory and Mathematics of Computing» (TMC)</b>																			
●	◆	●				●	●				◆	●	●	◆	●	●	●		●

● → Main activity ◆ → Lower activity and/or application domain



# The PEQUAN team

## PERformance & QUALity of Numerical Algorithms

### PEQUAN in a few words

- 7 permanent members, 5 PhD students
- our aim: improve **efficiency and reliability** of numerical algorithms
- expertise in both computer arithmetic and High Performance Computing

### Research fields of PEQUAN

- **Numerical reliability**  
development of efficient floating-point or fixed-point algorithms and their validation
- **HPC**  
design of parallel algorithms and performance optimization of numerical applications on various architectures (multicore CPUs, GPUs,...)
- **Image assimilation**  
applied to climate science



# MUMPS

MULTifrontal Massively Parallel sparse direct Solver

Reference software for solving large linear systems on high performance architectures

~ 10,000 users worldwide

## 5th edition of the MUMPS User Days

- 55 participants
- 21 talks

from Altair, Ansys, Ben Gurion Univ., Bordeaux Univ., CNRS, EDF, INRIA, LIP6, MUMPS Group, ONERA, Moduleering Company, Safran Tech, Univ. of Manchester, Univ. of Southern California, Univ. of Wuppertal



# Practical informations



- Talks and coffee breaks in room 25-26 105
- Lunch outside near tower 26
- Toilets in tower 26 (call us if door 25-26 closed)

# WIFI

- LIP6-guest  
enter the passwd given during this talk  
then in a browser, enter the login/passwd given  
within your badge
- eduroam also...



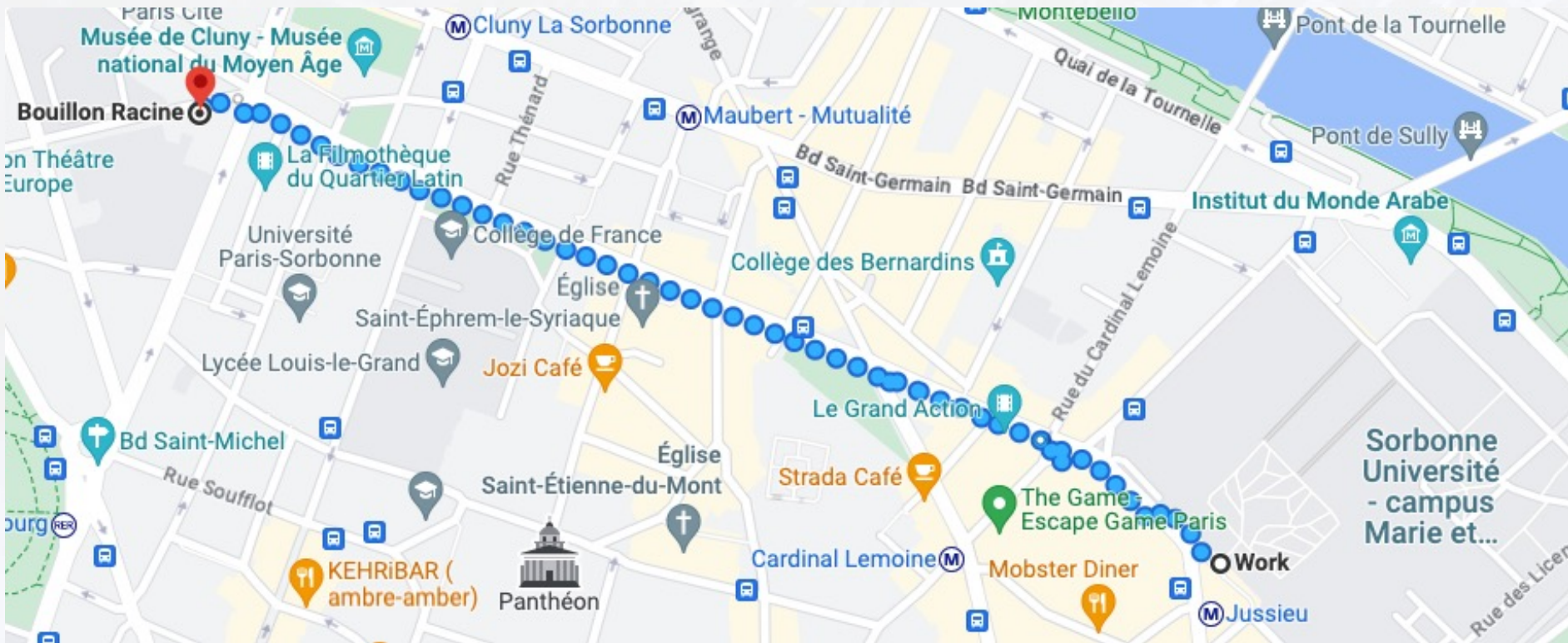
Tonight at 19:15: banquet



Address: Bouillon Racine, 3 rue Racine, Paris



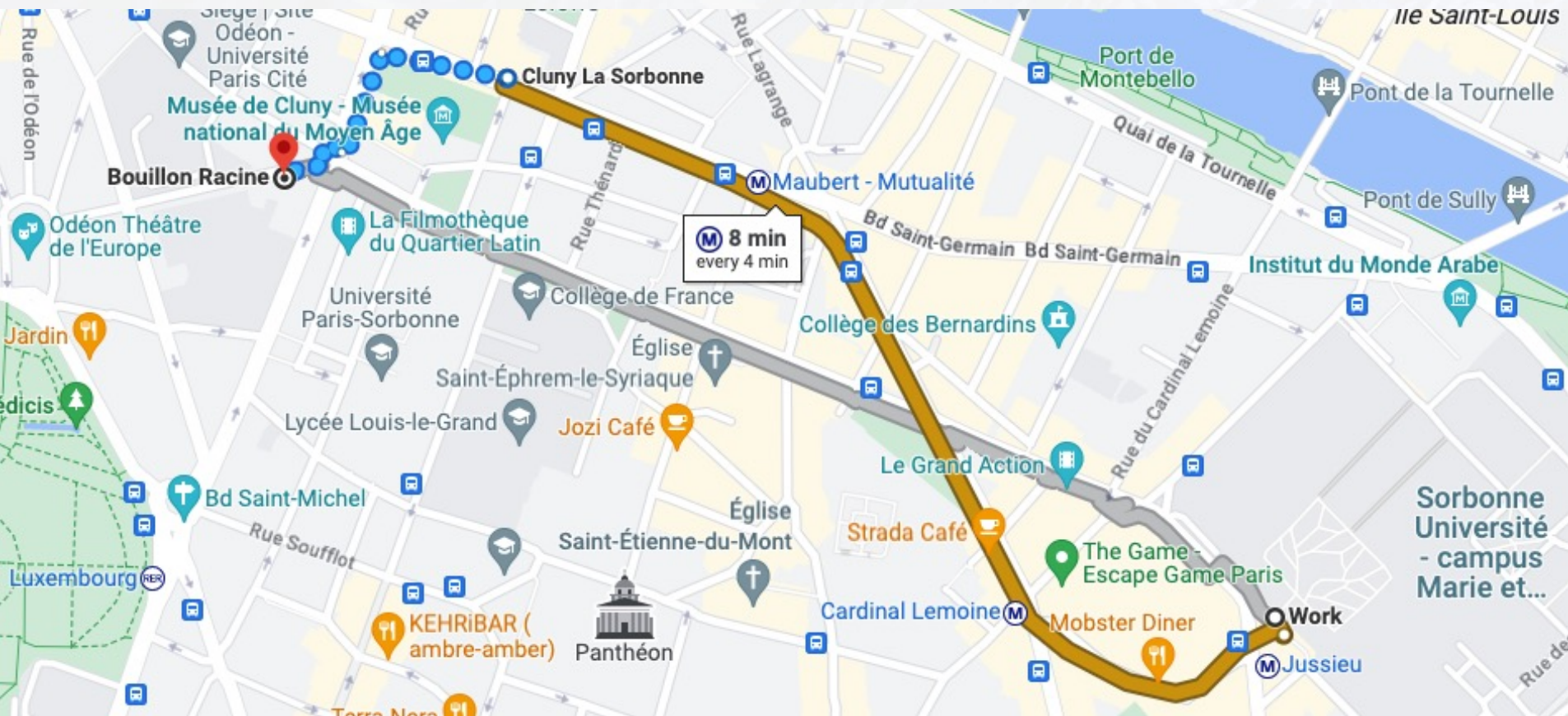
# To reach the banquet from LIP6



Rue Jussieu, then rue des Ecoles  
14 minute-walk (1 km)  
Departure from LIP6 at 19:00 at the latest



# To reach the banquet from LIP6



Metro Line 10 direction Boulogne  
Stop « Cluny La Sorbonne »  
8 minutes

# After the MUMPS User Days

If you don't need the plastic badge, we will be happy to take it for recycling .





The background is a deep blue color with a pattern of binary code (0s and 1s) in a lighter shade of blue. The pattern is arranged in a perspective that creates a sense of depth, with lines converging towards the top right. The text "Any questions?" is centered in the middle of the image in a white, sans-serif font.

Any questions?