« Introduction OF EMR'22 Summer school »

Prof. Philippe BARRADE, Prof. Alain BOUSCAYROL

HES-SO, Switzerland

L2EP, University of Lille, France
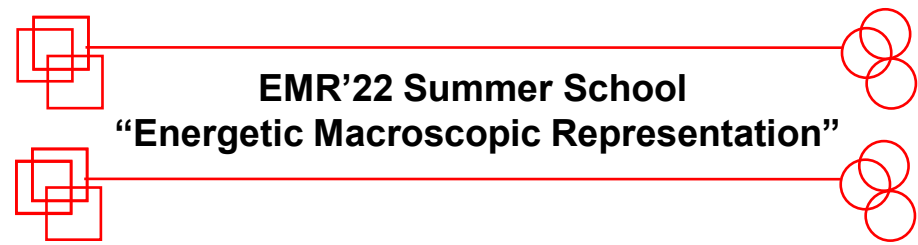
1   **HES-SO**

2   **EMR summer schools**

3   **EMR'22 organization**

« University of Lille & L2EP »

Prof. Betty LEMAIRE-SEMAIL,

(Univ. Lille, L2EP)

at the crossroad of Paris, London and Brussels
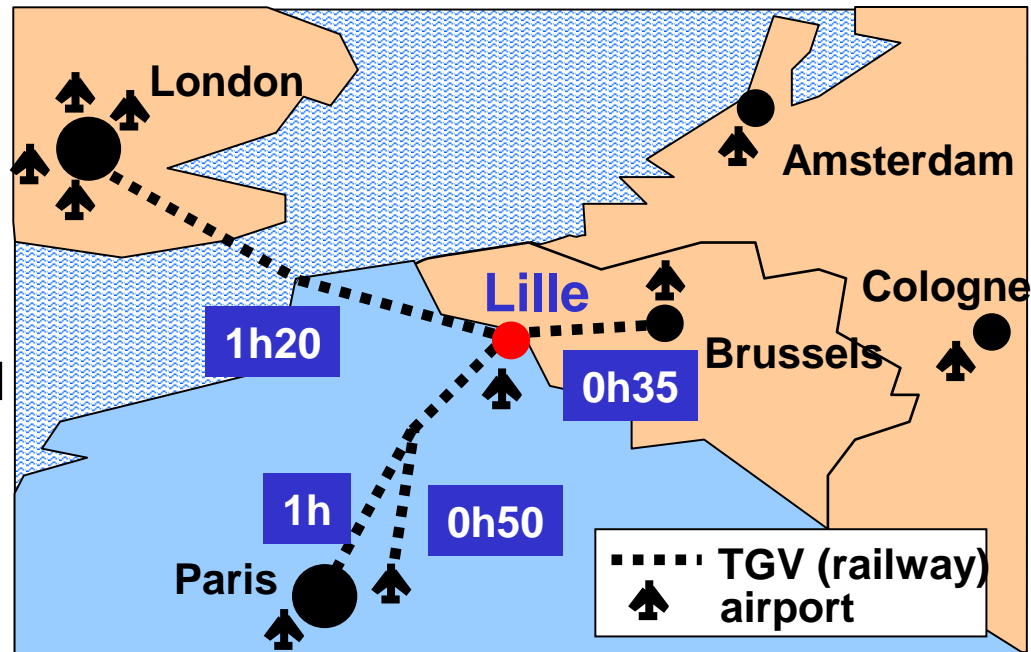
Lille and suburbs more than 1.5 million inhabitants

France

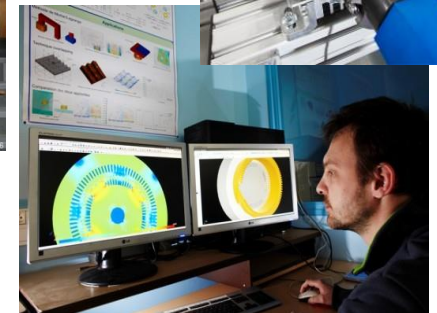University of Lille

72,000 students, 12% from abroad

66 research labs

https://www.univ-lille.fr/home/

London

Amsterdam

Lille

Brussels

Cologne

1h20

0h35

1h

0h50

Paris

TGV (railway)
airport

Université de Lille

- L2EP Lille -

EMR'22, Sion, June 2022

http://l2ep.univ-lille.fr/
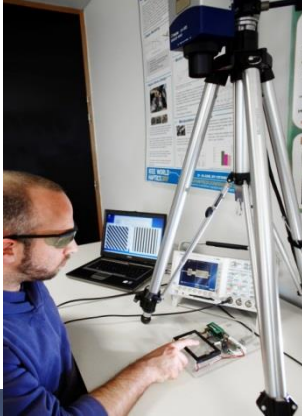
More than 100 members : 37 professors and associate professors,
40 PhD students, 15 lab's staff, Post-doctoral positions, Master students, etc.

- Research at L2EP -

EMR'22, Sion, June 2022

Prof. Betty LEMAIRE-SEMAIL

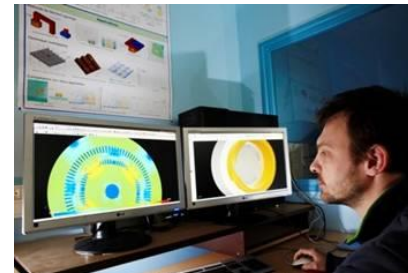| Control | Power electronics | Numerical tools & methods | Power grids |

Prof. Alain BOUSCAYROL   **Prof. Philippe LE MOIGNE**   **Prof. Abdelmounaim TOUNZI**   **Prof. Benoit ROBYNS**

EMR'22, Sion, June 2022

Objective

Control for innovative

and efficient
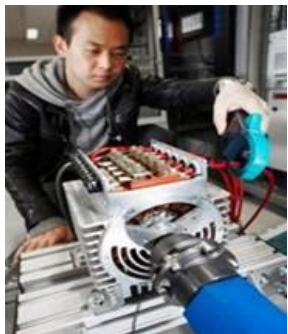
« electrical systems »

Piezoelectric actuators (F. Giraud)

April 2021
3 Professors
5 Associate Prof.
4 Engineers
1Technician
5 Post-Doc
14 PhD students
4 Master students

Formalisms for control

Multiphase drives (E. Semail)

Electrified vehicles (A. Bouscayrol)

electricity & Vehicles Platform (W. Lhomme)

Energetic Macroscopic Representation (EMR) and summer schools

Prof. Alain BOUSCAYROL,

(Univ. Lille, L2EP)
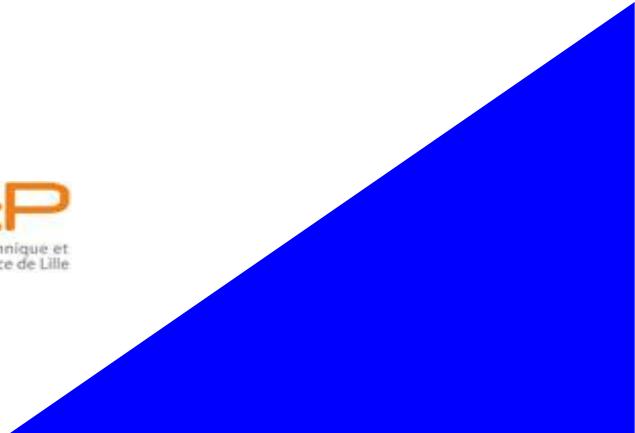
Prof. Betty LEMAIRE-SEMAIL
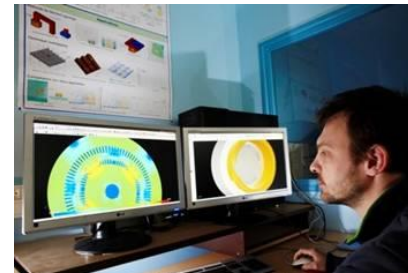
Control	**Power electronics**	**Numerical tools & methods**	**Power grids**
Prof. Alain BOUSCAYROL	Prof. Philippe LE MOIGNE	Prof. Abdelmounaim TOUNZI	Prof. Benoit ROBYNS

**EMR
(graphical description)**

=
organization
of models of
complex systems

Systematic deduction
of organization of
control schemes

v_{ref}

Strategy

- EMR and Education -

University of Lille, Polytech Lille, EC Lille

Master 1: EMR initiation

Master 2: EMR further development

Other French Universities and Engineering Schools

Cachan (2004) Belfort (2006), ParisTech (2010),

Compiegne (2012), Polytech Paris Sud (2014), etc.
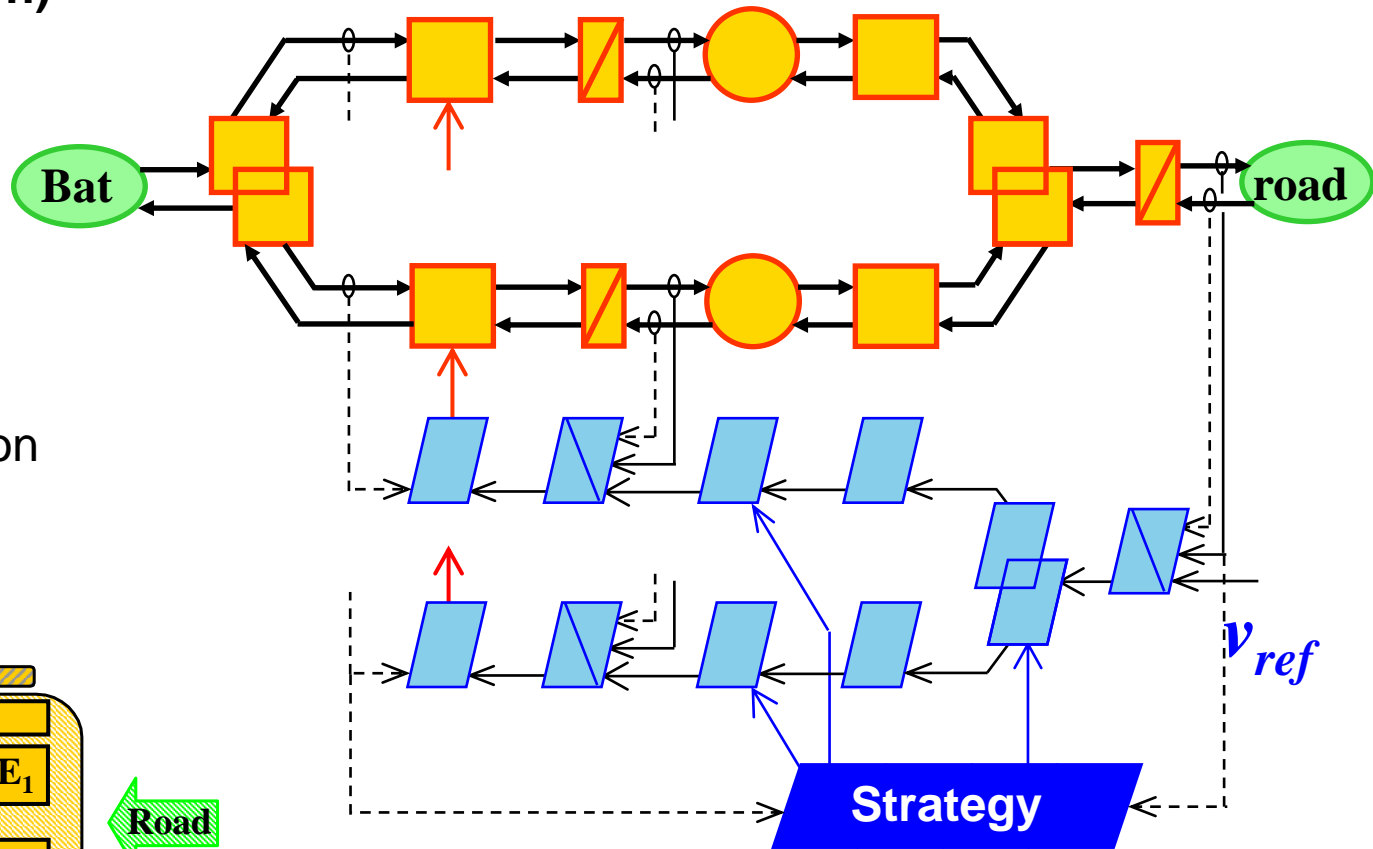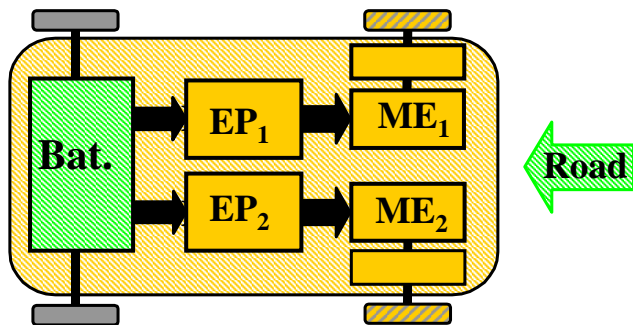
Universities abroad France

Univ. Trois-Rivières, Canada (2002)

EPF Lausanne, Switzerland (2005)

Harbin Institute of Technology, China(2008)

Univ. Tsinghua, Beijing, China(2008)

UPC, Barcelona, Spain (2010)

Univ. Graz, Austia (2012)

INES Coimbra, Portugal (2014)

Univ. Ap. Sc. Sion, Switerland (2015)

Univ. Sherbrooke, Canada (2015)

Univ. Oviedo, Spain (2016)

Univ. Santander, Colombia (2017)

Univ. Hanoi, Vietnam (2018) etc.

Simulation session, EMR'08, Harbin

Lecture session, EMR'12, Madrid
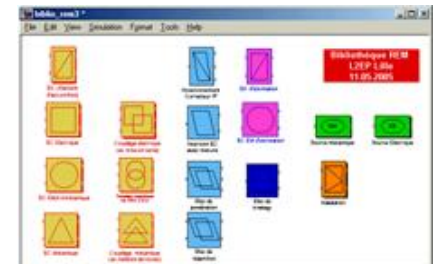
EMR Simulink library

- EMR & collaboration-

(Eindhoven, the Netherlands)

(Gent, Belgium)

(Trois-Rivières, Sherbrooke Canada)

(Cluj Napoca Romania)

(Lausanne Switerland)

(Harbin, China)

(Comibra Portugam)

(Hanoi, Vietnam)

(Cordoba, Argentina)

Industry:

PSA PEUGEOT CITROËN SIEMENS *Ingenuity for life* nexTer Valeo RENAULT *Passion for life* SNCF Typhoon HIL
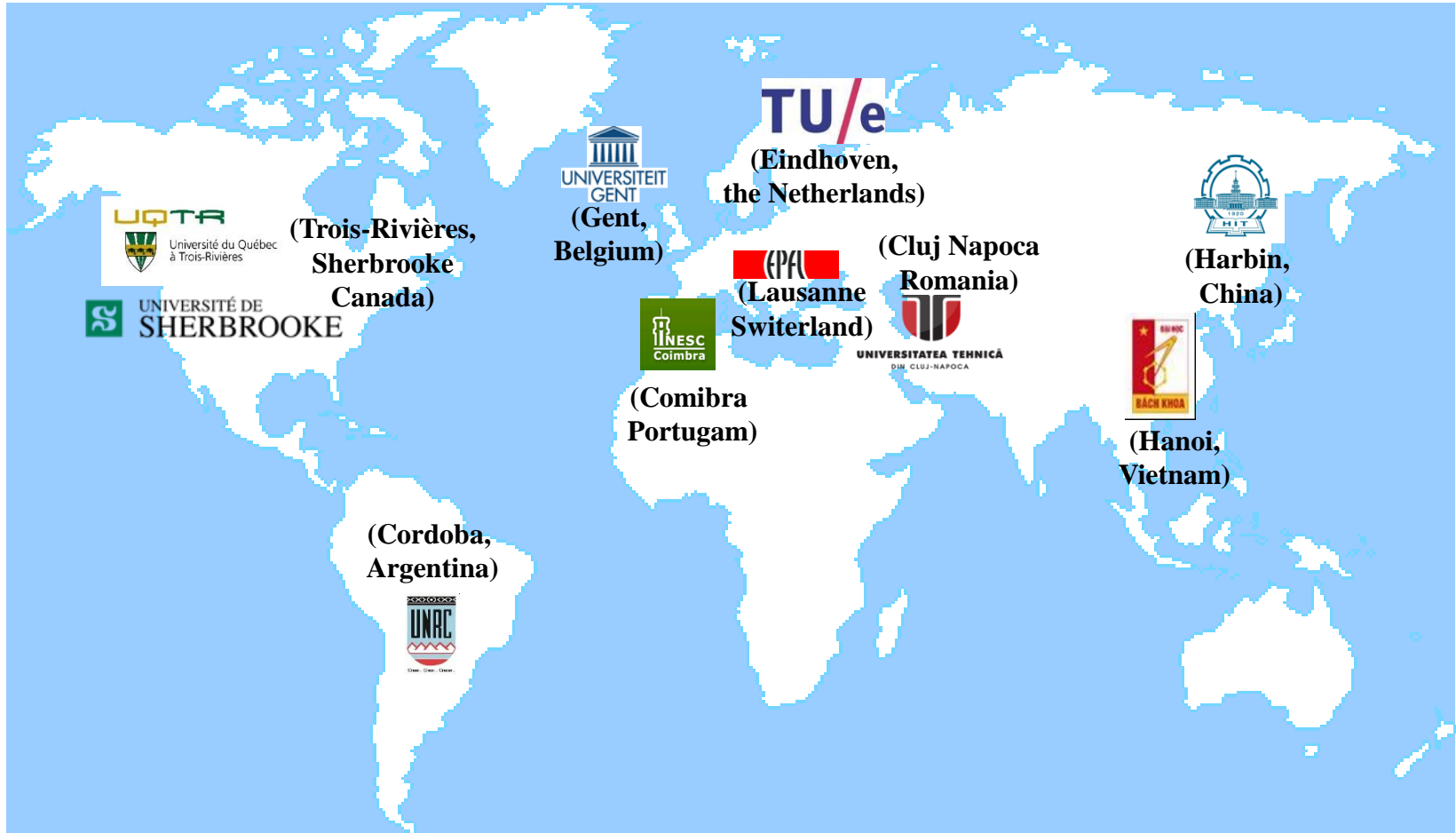
- EMR Summer Schools -

EMR'22, Sion, June 2022

Starting 2006, since 2011 annual, since 2013 odd years in Lille, even years abroad

EMR'09, Trois-Rivières

EMR'16, Montréal

EMR'06, EMR'13, EMR'15, EMR'17, EMR'19, EMR'21 Lille

EMR'14, Coimbra   EMR'12, Madrid   EMR'11, Lausanne   EMR'18, Hanoi   EMR'08, Harbin
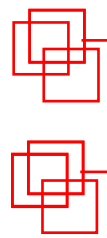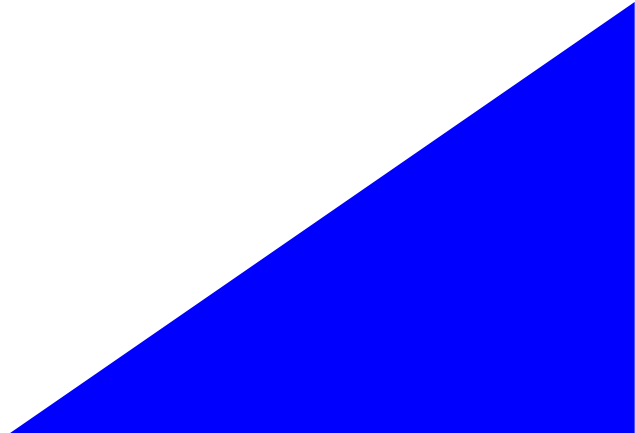
« EMR'22 Summer School »

Prof. Philippe BARRADE,

(HES-SO)

Hes·so VALAIS WALLIS

Haute Ecole d'Ingénierie π
Hochschule für Ingenieurwissenschaften

Introduction of EMR'22

- Hybrid Organization -

EMR'22, Sion, June 2022

concept lectures   application lectures   simulation

Montreal UCT-4	Paris UTC+2	Hanoi UTC+7	Monday 14	Tuesday 15	Wednesday 16	Thursday 17
	9:00	14:00		Simulation part 1	Simulation part 2	Simulation part 3
	9:30	14:30				
	10:00	15:00				
	10:30	15:30			Matlab	
	11:00	16:00			or	
	11:30	16:30			AMESIM	
	12:00	17:00				
	12:30	17:30				
	13:00	18:00				
	13:30	18:30				
8:00	14:00	19:00	intro	Application 1	Application xx	Application xx
8:30	14:30	19:30	Systemics	Application 2	Application xx	Application xx
9:00	15:00	20:00	EMR	Application xx	Application xx	Application xx
9:30	15:30	20:30		Application xx	Application xx	Application xx
10:00	16:00	21:00	Inversion control	Application xx	Application xx	Application xx
10:30	16:30	21:30	EV example	Application xx	Application xx	Application xx
11:00	17:00	22:00	RES example	Application xx	Application xx	Application 23
11:30	17:30	22:30	SW & HW	Application xx	Application xx	Application 24
12:00	18:00					
12:30	18:30					
13:00	19:00			Simulation part 1	Simulation part 2	Simulation part 3
13:30	19:30					
14:00	20:00					
14:30	20:30				Matlab	
15:00	21:00				only	
15:30	21:30					
16:00	22:00					

local + on-line for Asia, Africa Europe

on-line for North & South America

You have to select 1 of the 2 options

**1. Matlab-Simulink
In-presence**
P2-110, P2 building
Univ. Lille

Classical for
the summer school
no particular needs!

**2. Matlab-Simulink
On-line** Using ZOOM

2.1 with your own
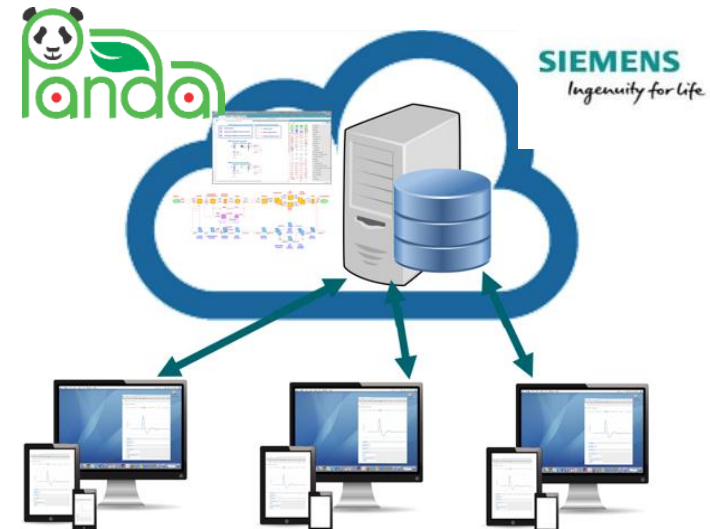Matlab-Simulink
No particular needs!

2.2. with the free
30-day Matlab trial
(see EMR21-Matlab
On-line.pdf)

to register
in advance!

**3. AMESIM
On-line**
Using ZOOM

Cloud of PANDA
(managed by SISW)
No particular needs!

Our simulation team (12 volunteers) will help you!

Typhoon HIL

Thanks to our valuable supports!

IEEE VTS
Connecting the Mobile World

Panda

GA 824256

MEGEVH
French network on HEV's

Hes·so VALAIS WALLIS
Haute Ecole d'Ingénierie
Hochschule für Ingenieurwissenschaften

Université de Lille

L2EP
Laboratoire d'électrotechnique et d'électronique de puissance de Lille

During EMR22: EMR-cloud (guidelines, simulation files, presentations the day after)
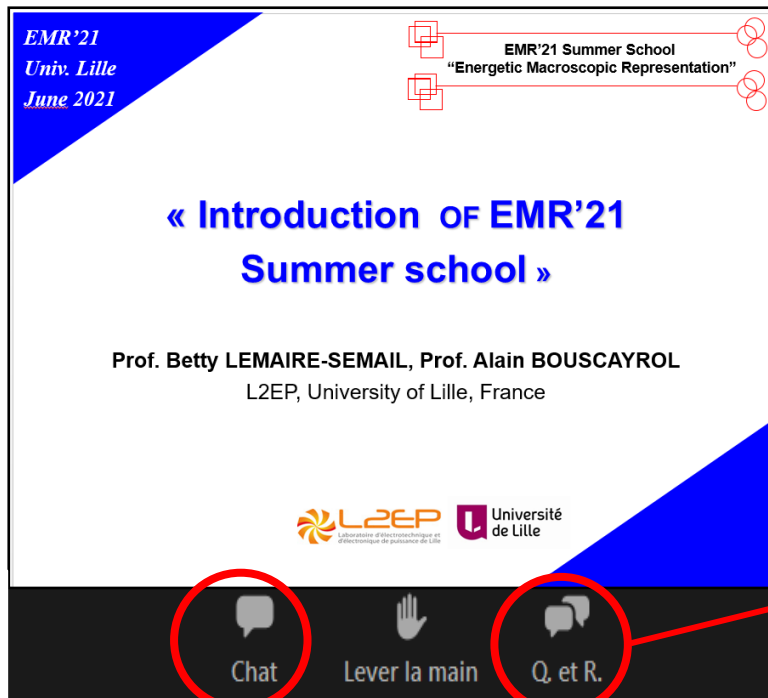see your information e-mail

After EMR22:
EMR web-site

All documents available
next week at
https://emr-website.univ-lille.fr/

Webmasters: Ryan O'BERRIEL

Any question: Alain.Bouscayrol@univ-lille.fr

Miscellaneous

Problem with ZOOM?
Stop & Restart = 75% of solutions

EMR'21
Univ. Lille
June 2021

EMR'21 Summer School
"Energetic Macroscopic Representation"

« Introduction OF EMR'21
Summer school »

Prof. Betty LEMAIRE-SEMAIL, Prof. Alain BOUSCAYROL
L2EP, University of Lille, France

L2EP
Laboratoire d'électrotechnique et
d'électronique de puissance de Lille

Université
de Lille

Chat   Lever la main   Q. et R.

During lectures
•turn off microphone
•open your mind!
(increase of the flow quality)

For questions
•ask your question by Q&R
•chairman gives you the floor
•turn on your microphone
give your name & affiliation
and take the question
(no question = no interest)

CHAT: for general issues or info only
(lack of sound, screen share, etc.)