

IMT GROUP OF GRADUATE ENGINEERING SCHOOLS

INSTITUT MINES-TÉLÉCOM

Pierre Perdiguier

IMT Ales University, Acting President



CONTENTS



1. ABOUT IMT GROUP

- Higher education
- Research
- Innovation



2. DOCTORAL COURSES IN THE IMT GROUP



3. FOCUS ON IMT'S THREE SCHOOLS

- IMT Atlantique
- IMT Albi
- IMT Alès



4. DISCUSSION WITH PHD STUDENTS

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- IMT Alès



4. DISCUSSION WITH PHD STUDENTS

WHAT IS THE IMT GROUP?

A group of higher education graduate schools

10 National *Grandes Écoles*

Small-size elite schools with strict selection

Affiliated with the Ministry for Industry and Digital Economy

More than 200 years of history

Master's and PhD degrees

The largest group of France's engineering schools



WHERE IN FRANCE?

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IMT Atlantique

Brest

IMT Alès

IMT Mines Alès

Nantes

IMT Albi

IMT Mines Albi

Toulouse

Montpellier

Marseille

Nice

Lille

Paris

Strasbourg

Lyon

Mines Nancy
(INSIC)Mines Saint-
Etienne

Eurecom

RANKING

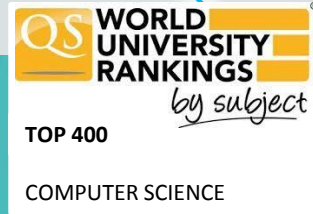
Télécom Sud Paris

Télécom Paris

IMT Lille-Douai

IMT Business School

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IMT Atlantique



IMT Alès



IMT Albi



Group A BEST FRENCH
ENGINEERING SCHOOLS



Mines Nancy (INSIC)



Group A+ BEST FRENCH
ENGINEERING SCHOOLS

IMT Saint-Etienne



Eurecom



Energy Engineering



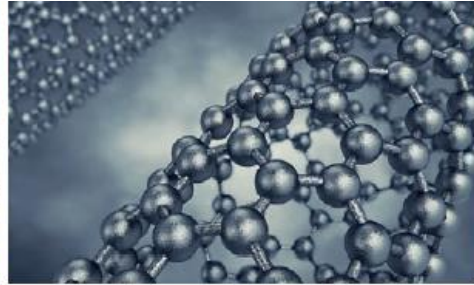
Health Engineering

Civil Engineering



Mechanical Engineering

Materials Engineering



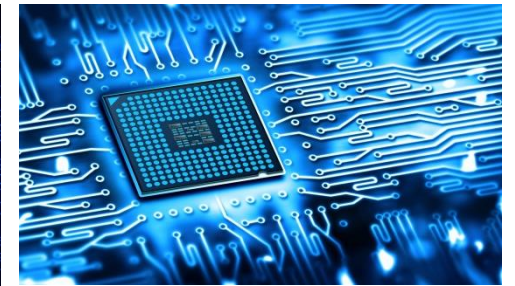
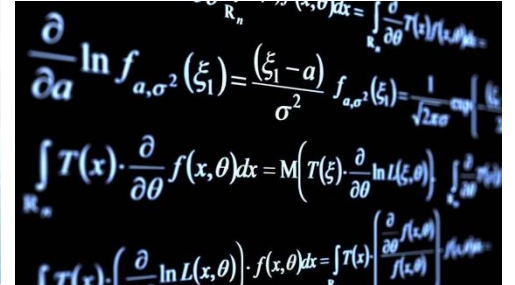
Environmental and Disaster Prevention Engineering

CS, AI













Cyber-security

Applied Mathematics



Electronics Engineering

SPECIALTIES FOR EACH MT SCHOOL

	IMT Schools:	Atlantique	Albi	Alès	Paris Télécom	Sud Paris Télécom	Paris Business School	Lille	Nancy	Saint-Etienne	Eurecom
	Energy Engineering	●	●	●				●	●	●	
	Health Engineering	●	●	●						●	
	Civil Engineering			●				●	●		
	Mechanical Engineering	●	●	●			●	●	●	●	
	Materials Engineering		●	●				●	●	●	
	Environmental and Disaster Prevention Engineering	●	●	●				●	●	●	
	CS, AI	●	●	●	●	●	●	●	●	●	●
	Cyber-security	●			●	●		●		●	●
	Applied Mathematics	●			●	●			●	●	
	Electronics Engineering	●			●	●				●	

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- **Higher education**
- Research
- Innovation

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4. DISCUSSION WITH PHD STUDENTS

KEY FIGURES ON HIGHER EDUCATION AT IMT GROUP

11



Students: 12 500

PhD students: 1 500

International students: 4 000 (30%), 60 countries

Employees: 4 000

Researchers: 2 000

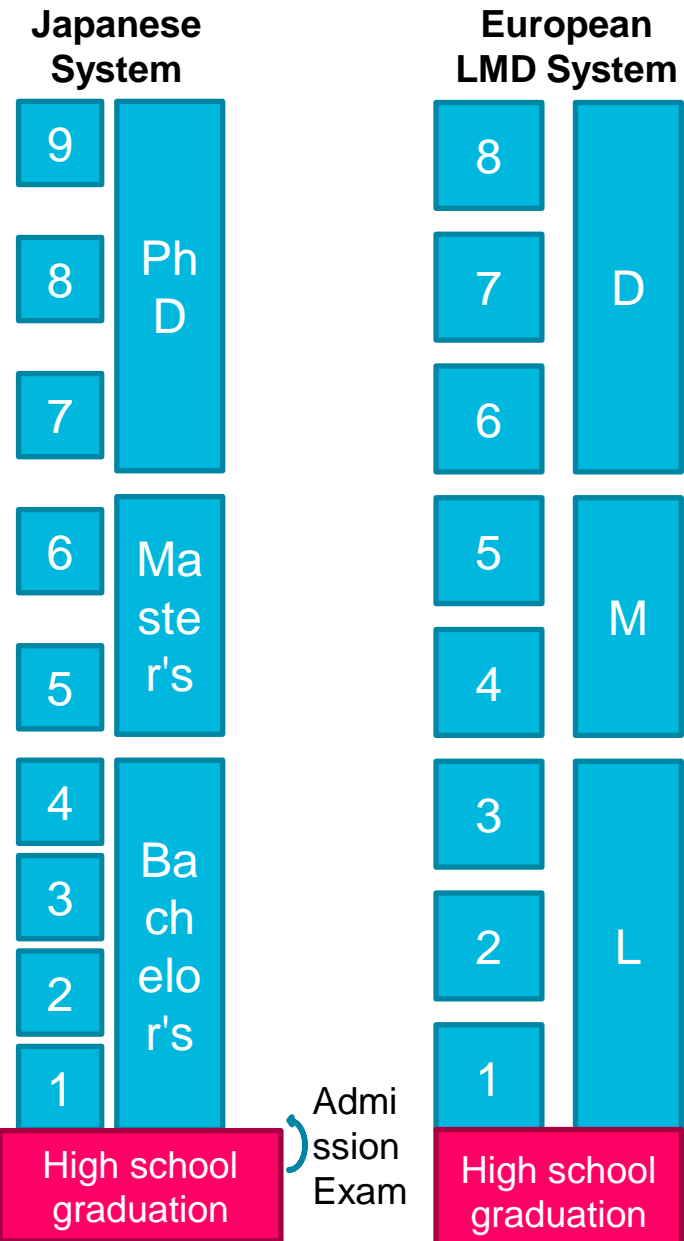
1 teacher for 7 students

Programs taught in English: 50

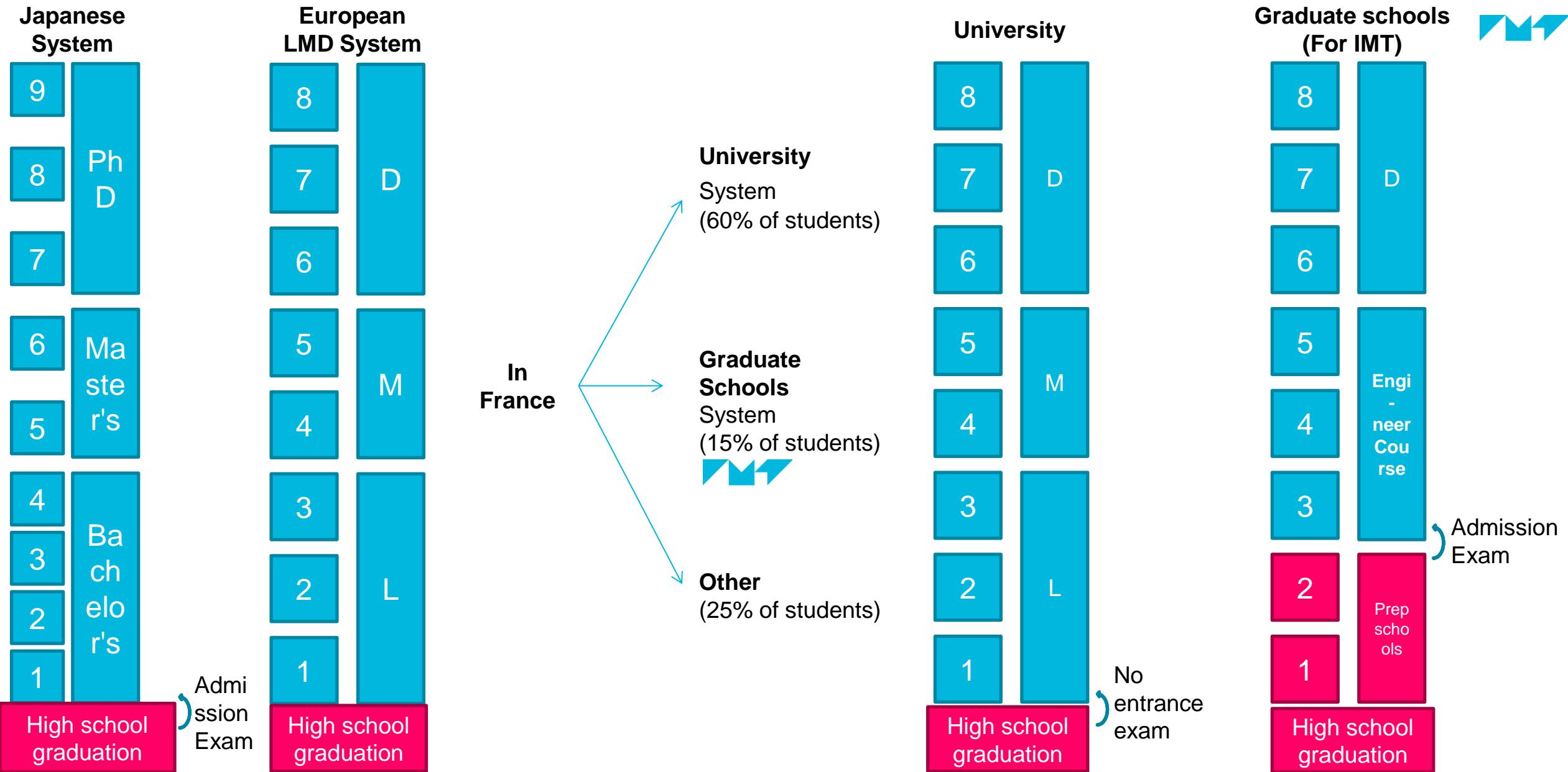
MOOC Online lectures: 50

MOOC registered students: Over 1 million

HIGHER EDUCATION SYSTEM IN GRADUATE SCHOOLS

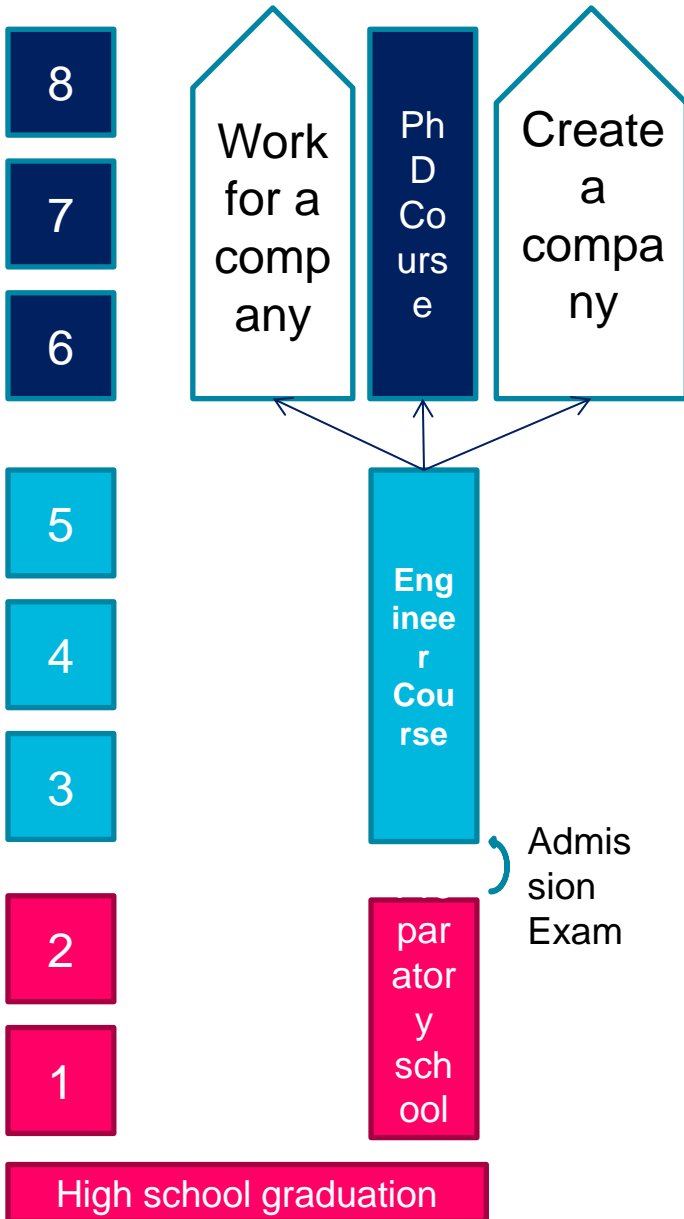


HIGHER EDUCATION SYSTEM IN GRADUATE SCHOOLS



STUDYING AT IMT: BEFORE, DURING AND DOCTORAL COURSE (FOR FRENCH STUDENTS)

14



After graduating from the engineer course

3 possibilities

1. Work for a company.
2. Continue with the doctoral course for **3 years** and do research.
3. Create a company in an IMT incubator.

IMT engineering course

Study for **3 years** at the school

Last year of Japanese Bachelor's degree + 2 years of Japanese Master's Degree

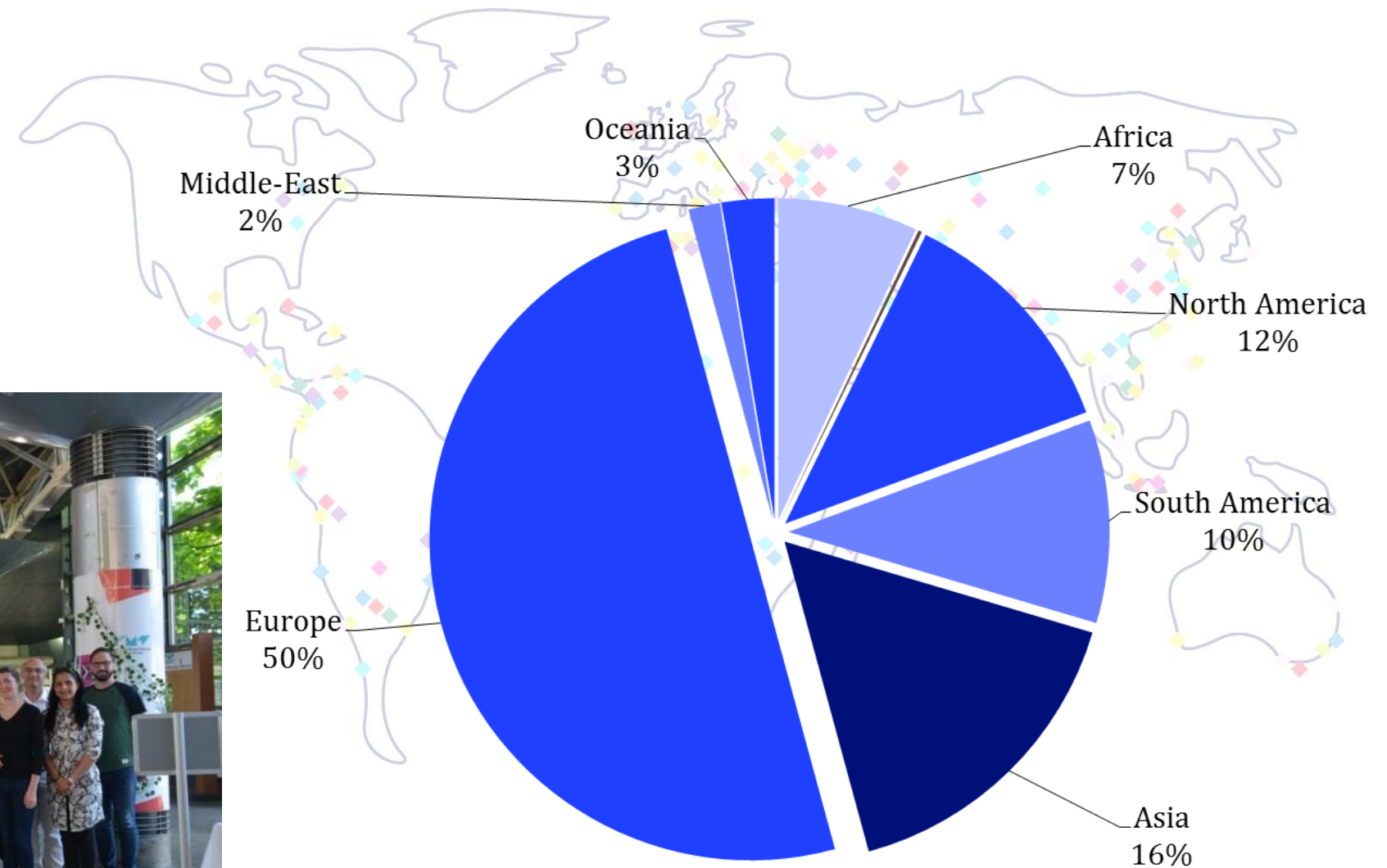
Qualify as an engineer.

Before entering IMT school

After graduating from high school,

Study mathematics and physics for **2 years** in a preparatory school,
Pass the national examination for admission to engineering school,
and be admitted.

Over 500
international
partnerships

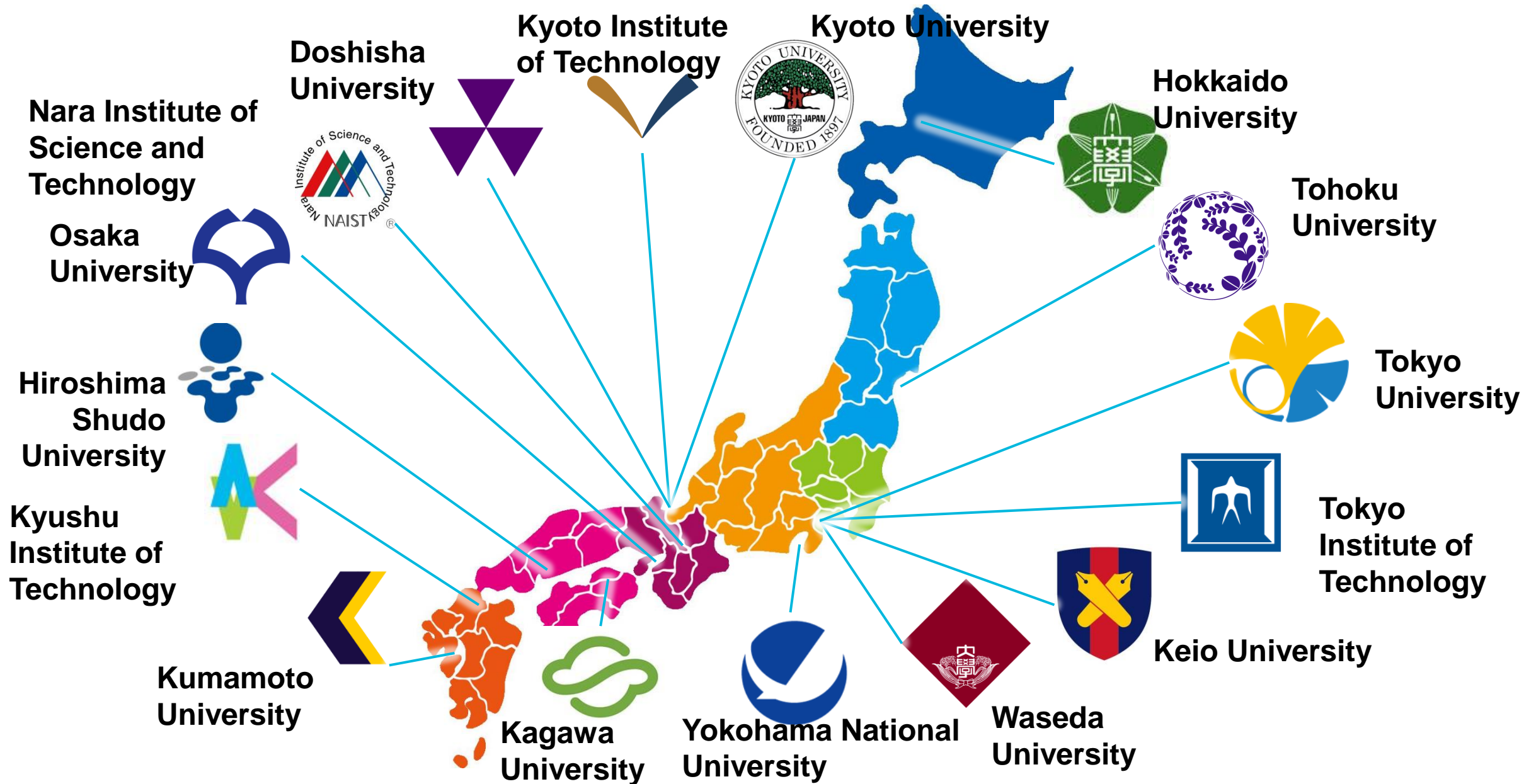




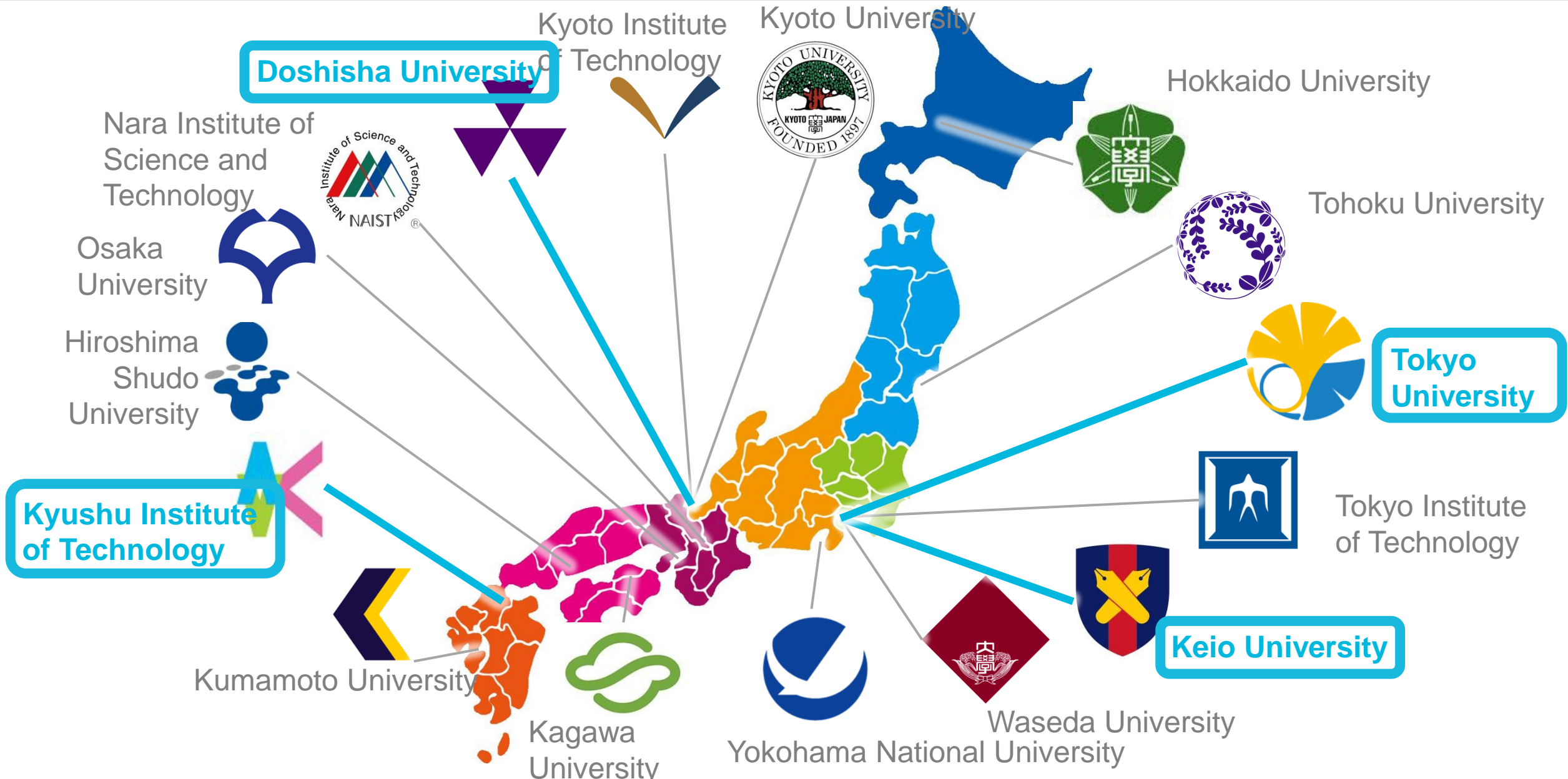
Mutual Awareness Treaty on University Qualifications between Japan and France concluded in 2014

Purpose: Strengthen exchanges between Japanese and French universities

IMT STUDENT EXCHANGE PARTNERSHIPS WITH JAPANESE UNIVERSITIES: 16



IMT DOUBLE DEGREE PARTNERSHIPS WITH JAPANESE UNIVERSITIES: 4



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- Innovation

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4. DISCUSSION WITH PHD STUDENTS

KEY FIGURES FOR IMT GROUP'S RESEARCH FIELDS

20



Researchers: 2 000

Laboratories: 30

- IMT research units : 10
- Joint research units (with CNRS,CEA...): 20

International research institutes: 6

European Community
Scientific Research Projects: ~100

Publications: 2 000 / year

Nobel Prizes: 2



Promote cooperation between Japan and France
from 2019 to 2023.

IMT RESEARCH COLLABORATION WITH JAPANESE INSTITUTIONS



Industrial Technology
Multidiscipline laboratory



Hokkaido University



Tohoku University



Japan Advanced Institute of Science and Technology
Graduate Institute of Technology



World Disaster Prevention Research Institute Union



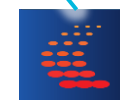
Osaka University



Kagawa University



Tokyo Metropolitan
University



Fire fighting
Research Center



Telecommunications
Research Organization



Institute of Statistical Mathematics



Research Institute for
Disaster Prevention

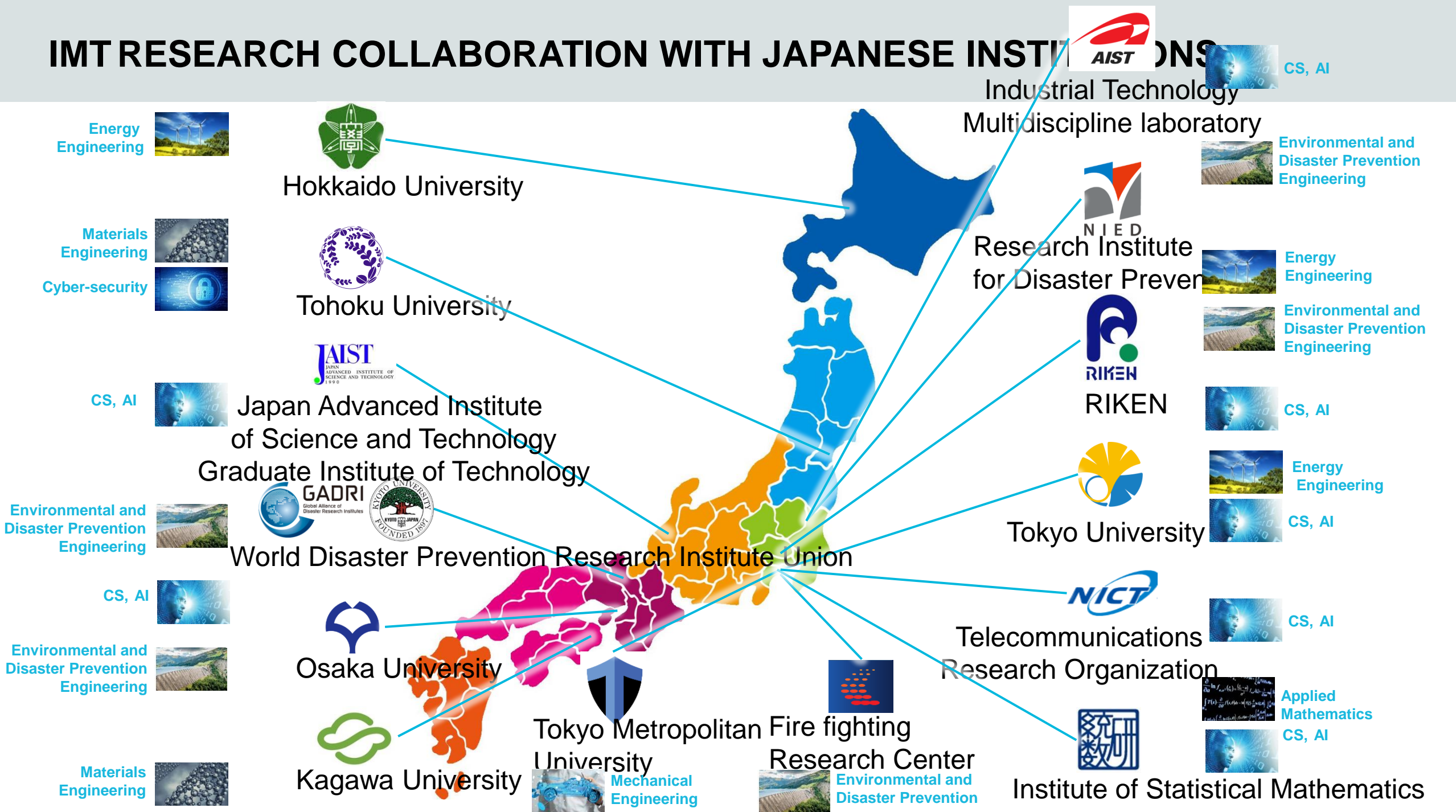


RIKEN

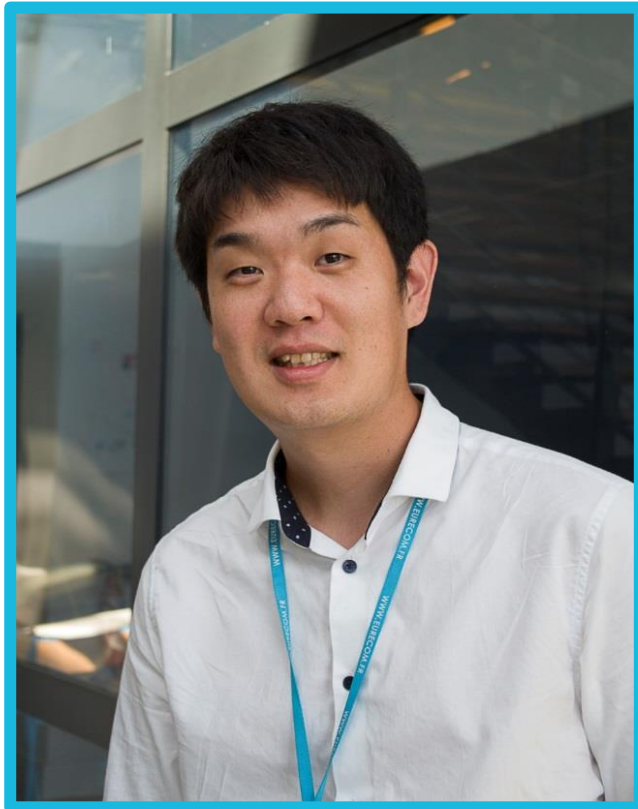


Tokyo University

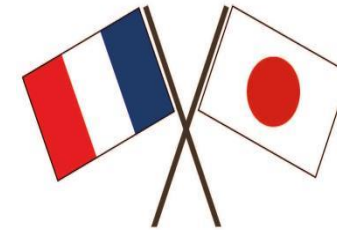
IMT RESEARCH COLLABORATION WITH JAPANESE INSTITUTIONS



- M. Motonobu Kanagawa
- Eurecom
- Data Science and Applied Mathematics



“ I am happy to be able to work here at IMT. It is rewarding both personally and in terms of work. You can do what you want in the areas you're interested in.



I work not only with colleagues in Japan, France and Germany, but with universities around the world: universities in the USA, in Finland, as well as London and Oxford colleges in England”

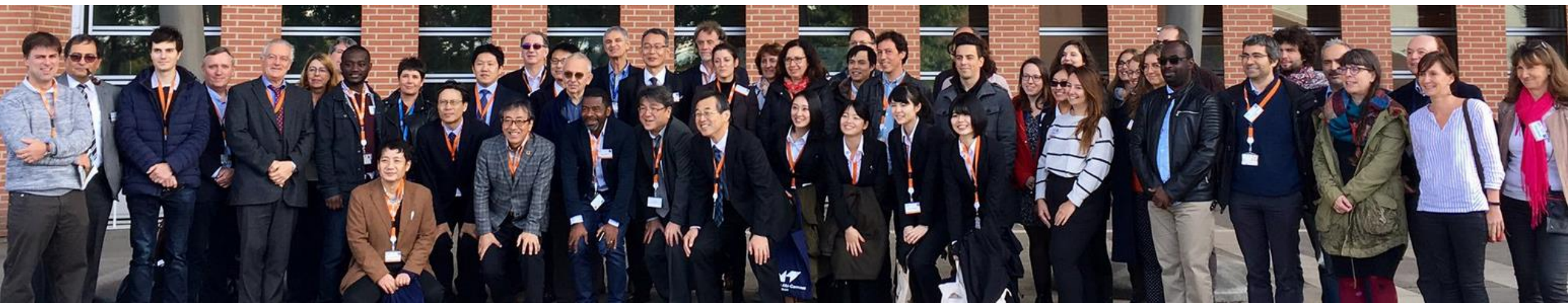
- Every year since 2016
- IMT and the Institute of Statistical Mathematics
- Applied Mathematics and Artificial Intelligence
- Near Nice



- 2019
- IMT and Tohoku University
- Materials Engineering
- Near Toulouse
- A seminar in Sendai, Japan is planned next



REPORT ON SAKES 2019



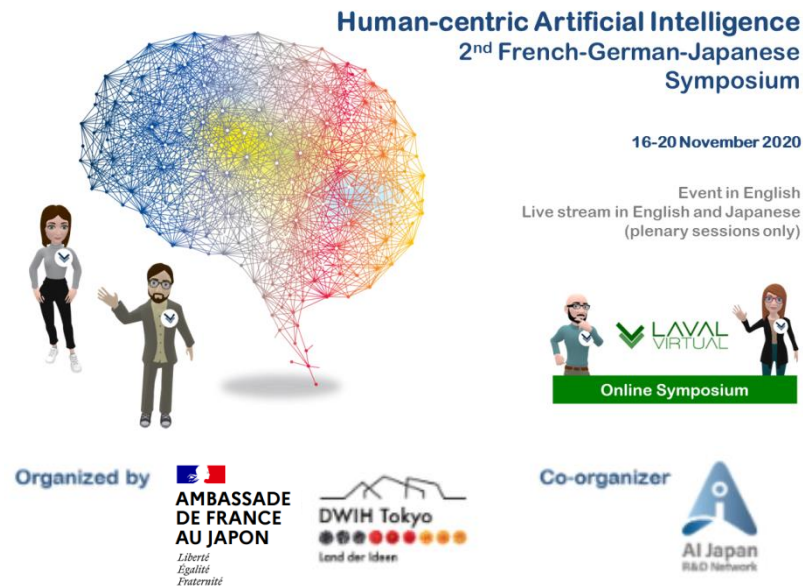
PARTICIPATION IN EVENTS AT THE FRENCH EMBASSY (EXAMPLE)

27

- 2017
- French-Japanese Week on Disaster Risk Reduction



- 2020
- French Embassy, German Embassy and AI Japan
- Artificial Intelligence



- 2021
- French Embassy and Tokyo Institute of Technology, among others
- Materials engineering and production engineering



1st French-Japanese Workshop
on Additive Manufacturing

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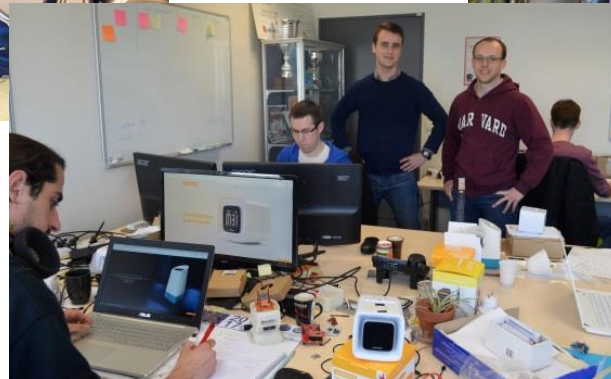
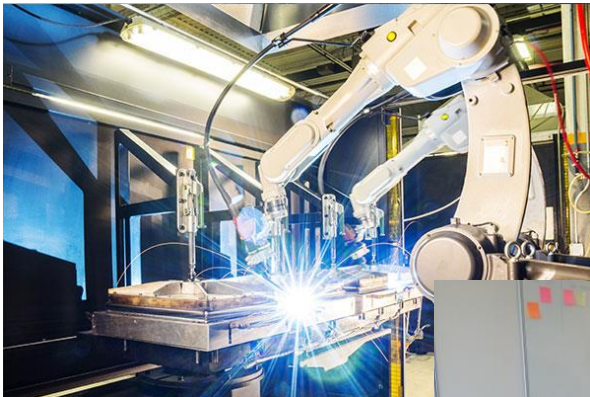
4. DISCUSSION WITH PHD STUDENTS

KEY FIGURES FOR THE IMT GROUP'S INNOVATION FIELDS

Patents: 60 per year

Company-affiliated
research institutes: 50

Incubator organizations: 11



There are two types of IMT incubators:



Technology incubators

Mission: Support system for business creators.



Student incubators

Mission: Educate and support students in the concepts and practices of building a company.





more than
70

Companies
established
(in a year)


84%

Survival rate
after 5 years

170

Number of
supported projects

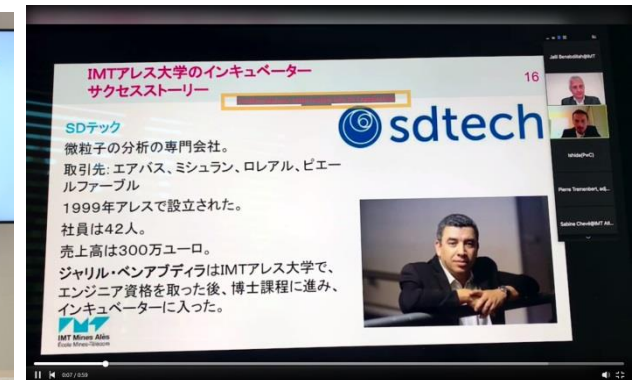


IMT'S INTERNATIONAL PARTNERSHIPS IN THE INNOVATION FIELDS

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“Station AI” project



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4. DISCUSSION WITH PHD STUDENTS

- While in the doctoral program, **you can get a salary for three years.**
- **You don't need to speak French.** English ability will be assessed by interview.
- Four ways:
 1. **Apply for the PhD program at IMT:** Apply directly to IMT. By the end of May, send a letter detailing your motivations with your resume and master's transcript. Interviews will take place in June, and the doctoral program starts in November. There is still time to apply for 2022 !
 2. **French or Japanese scholarships:** Students apply for scholarships themselves. IMT can discuss the theme of the thesis with the students. As a result, admission dates to IMT vary depending on the scholarships.
 3. **Double Degree (co-tutorship or “cotutelle”):** This program is a research collaboration between Japan and France. Registration at Japanese and French universities is required. Spend 3 or 4 years in both universities. Students consult with research institutes both in Japan and France on their research themes.
 4. **Doctoral course training (1 to 3 months):** This program is also a research collaboration between Japan and France. Japanese students can receive a short training at a French university while enrolled in a Japanese university.

- IMT will provide about 100 theses every year.
- The list of theses is detailed in another document.
- If you are interested, please contact us by the end of May. After that, you can have individual discussions with schools and research institutes.



https://jp.ambafrance.org/IMG/pdf/funding_schemes_for_the_french-japanese_cooperation_-_dec.2020.pdf?28114/ab0a505fb14075b2b3a45429f52eda19c4237402



CAMPUS FRANCE
campusfrance.org

Grant search engine

Search

Filters:

- Type of grant >
- Level >
- Subject area >
- Nationality >

→ 37 grants found on 260

Active filters: Japan ✕ Study ✕ Research ✕ Internship ✕ PhD ✕

BOURSE ERASMUS MUNDUS ACTION 2: TEAM - TECHNOLOGIES IN INFORMATION AND COMMUNICATION EUROPE-EAST ASIA MOBILITIES

<http://campusbourses.campusfrance.org/fria/bourse/#/catalog>



■ Support for doctoral students.

■ 3 possibilities:

- Work for a company in the innovation field. (55%)
- Become a researcher at a public laboratory. (45%)
- Create a start-up as an incubator engineer. (5%)

■ Employment:

- 80% France
- 10% Europe (outside of France)
- 10% World (outside of Europe)

■ Satisfaction level:

- 95% of doctoral students are satisfied or very satisfied with their post-thesis career.

- Dormitory
- Student cafeteria
- Orientation
- Employment advice
- Sports facilities
- Int'l Student Association
- Lots of club activities
- Free French lessons (optional)



And more!

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- **IMT Atlantique (2 examples)**
 - IMT Albi
 - IMT Alès

4. DISCUSSION WITH A PHD STUDENT

IMT Atlantique**Brest****Lille****Paris****Strasbourg****Mines Nancy
(INSIC)****IMT Alès**

IMT Mines Alès

Nantes**Mines Saint-Etienne****IMT Albi**

IMT Mines Albi

Lyon**Eurecom****Toulouse****Montpellier****Marseille****Nice**

3 CAMPUSES



Brest



Nantes



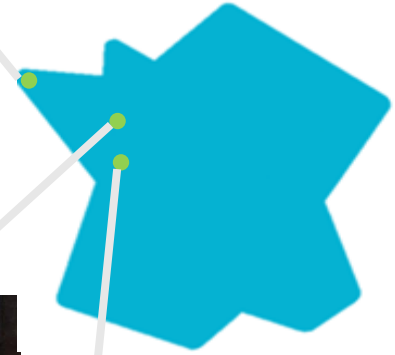
Rennes

Incubators



TOURISM, SPECIALTIES

43



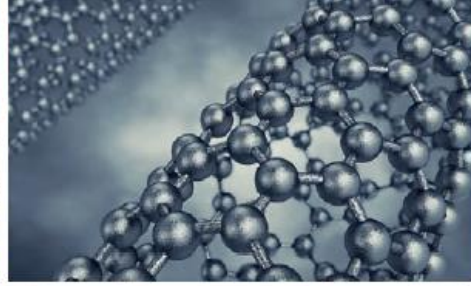
Energy
Engineering



Civil
Engineering



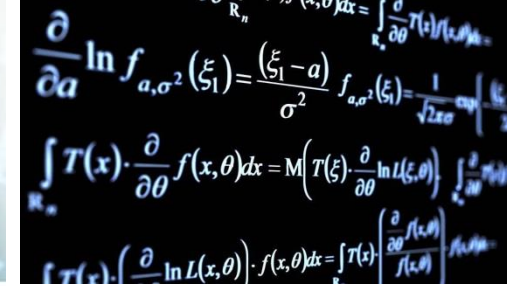
Materials
Engineering



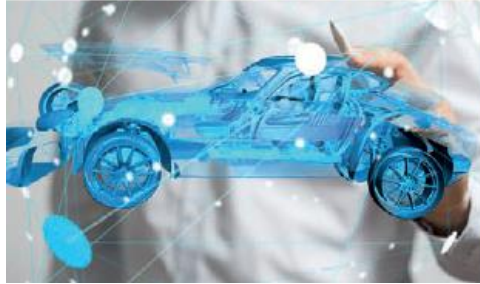
Computer
sciences, AI



Applied
Mathematics



Health
Engineering



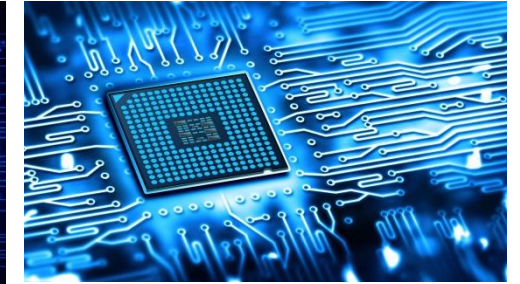
Mechanical
Engineering



Environmental
and Disaster
Prevention
Engineering



Cyber-security



Electronics
Engineering

- Name: Yuqing Hu
- Nationality: Chinese
- Education: China, France
- Subject of PhD thesis :
Deep Learning with few data



“This experience at IMT is very positive, rich and diversified. Deep Learning is a very competitive field of research and yet the environment helps me tackle the problems with confidence and determination. When I graduate, I hope to be able to join one of the top research team in the domain in industry in the world”

Classical Machine (Deep) Learning:



Lots of resources



+ lots of computing resources => suitable for big companies



Objective: make Deep Learning accessible to most: small companies, associations, labs, citizens...

How?

- Train with few examples
- Adapt with few steps

Leveraging the Feature Distribution in Transfer-based Few-Shot Learning		
Yuqing Hu IMT Atlantique Orange Labs	Vincent Gripon IMT Atlantique	Stéphane Pateux Orange Labs

- Ranked #1 on international benchmarks in the field
- High accuracy (~90%) with as low as 5 examples per class for 5 classes

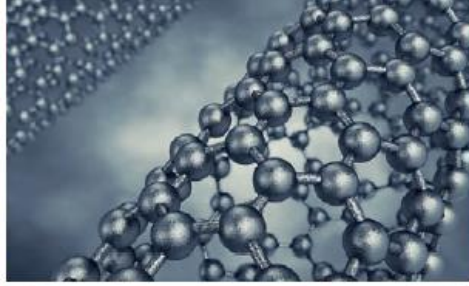
Energy Engineering



Civil Engineering



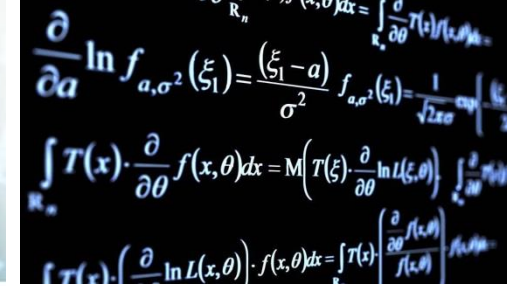
Materials Engineering



CS, AI



Applied Mathematics



Health Engineering



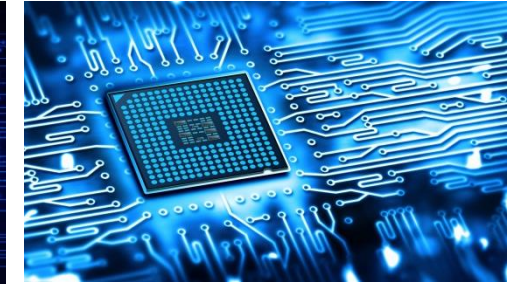
Mechanical Engineering



Environmental and Disaster Prevention Engineering



Cyber-security



Electronics Engineering

- Name: Léo Lavaur
- Nationality: French
- Education: France, Spain
- Subject of PhD thesis :

Collaborative Security Approaches for IT and OT



“IMT and the Cyber CNI project are the perfect research environment. The project is a great opportunity combining the excellent research of IMT with the industrial experience offered by the partners on cutting-edge technologies and real-world problems.”



Thesis objective: study algorithms and methods for collaborative threat detection, attack prevention and defense.

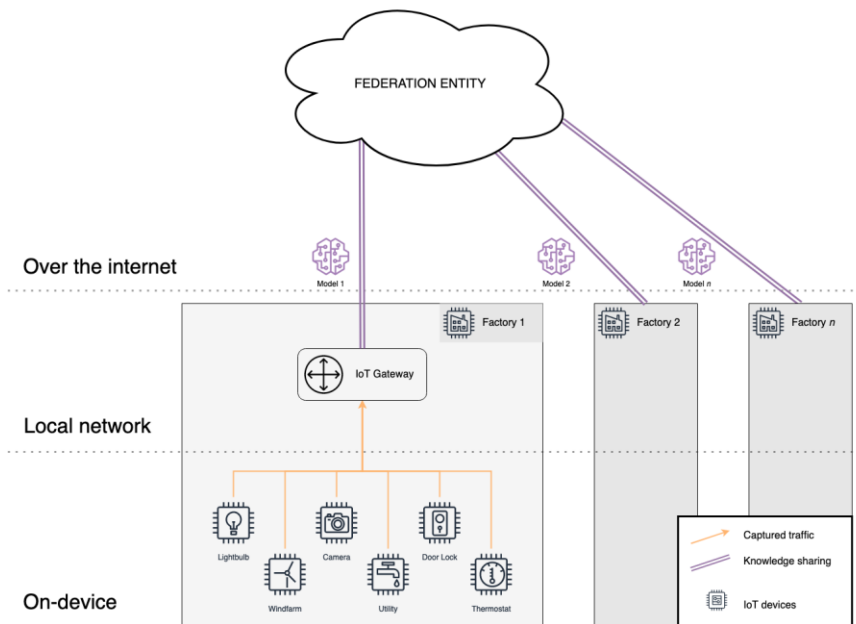
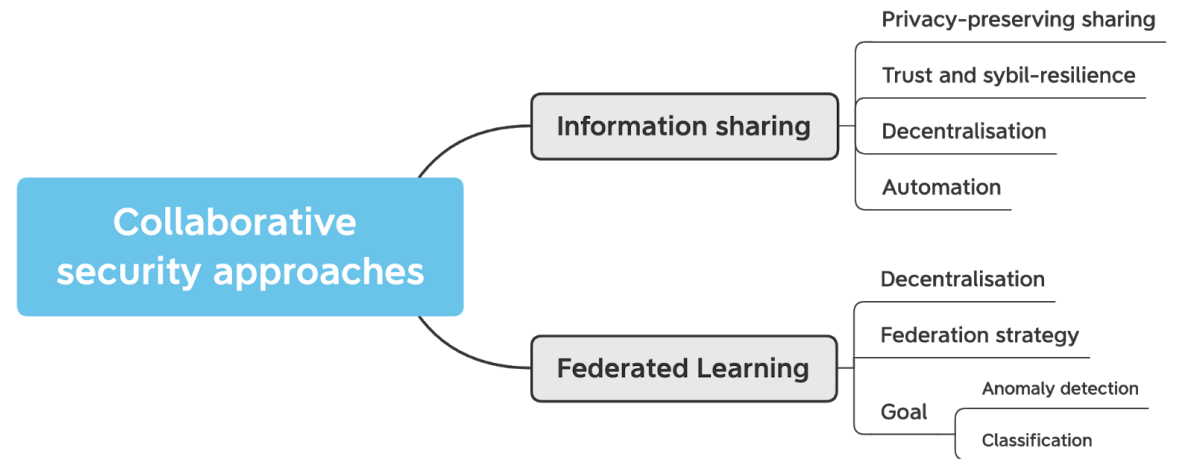


Fig 1. Example architecture of federated attack detection system for industrial infrastructures

- IoT traffic is analyzed by a gateway
- The trained model is shared via the federation entity
- Every organization benefit from the the training of the other for its own detection system
- No traffic is shared



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- IMT Alès

4. DISCUSSION

Télécom Sud Paris

Télécom Paris

IMT Lille-Douai

IMT Business School

IMT Atlantique

IMT Atlantique

Brest

Lille

Paris

Strasbourg

Mines Nancy

Mines Nancy (INSIC)

IMT Alès

IMT Mines Alès

Nantes

IMT Saint-Etienne

Mines Saint-Etienne

IMT Albi

IMT Mines Albi

Lyon

Eurecom

Eurecom

Nice

Toulouse

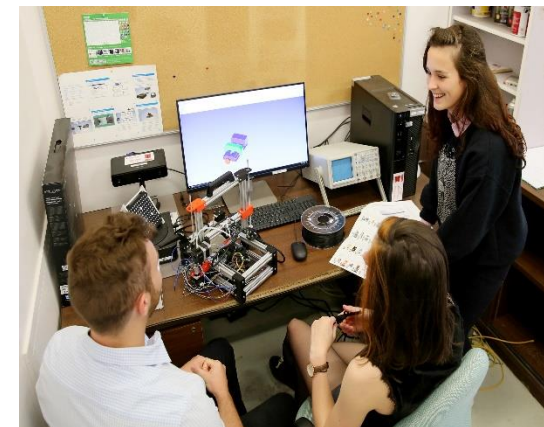
Montpellier

Marseille





22-hectare campus



TOURISM, SPECIALTIES

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IMT'S TECHNICAL SPECIALTIES

55

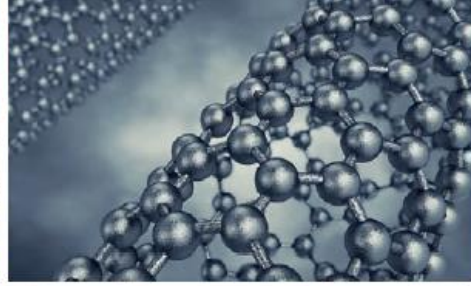
Energy
Engineering



Civil
Engineering



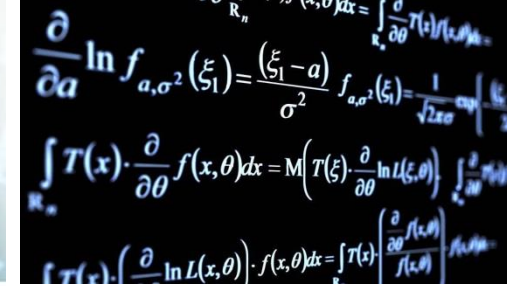
Materials
Engineering



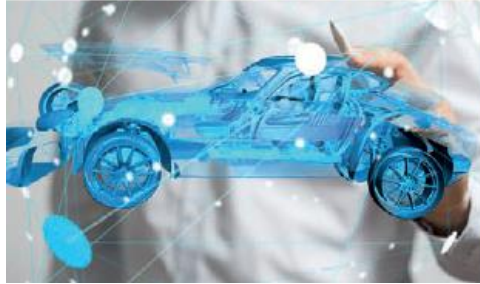
CS, AI



Applied
Mathematics



Health
Engineering



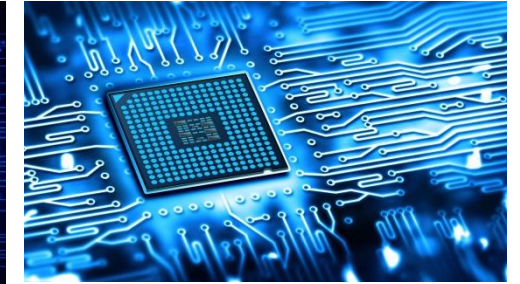
Mechanical
Engineering



**Environmental
Engineering**



Cyber-security



Electronics
Engineering

- Name: Manel Nasfi
- Nationality: Tunisian
- Education: Tunisia, France
- Subject of PhD thesis:
Rapid pyrolysis of contaminated biomass



“IMT allows me to satisfy my passion for processes useful for the environment.”

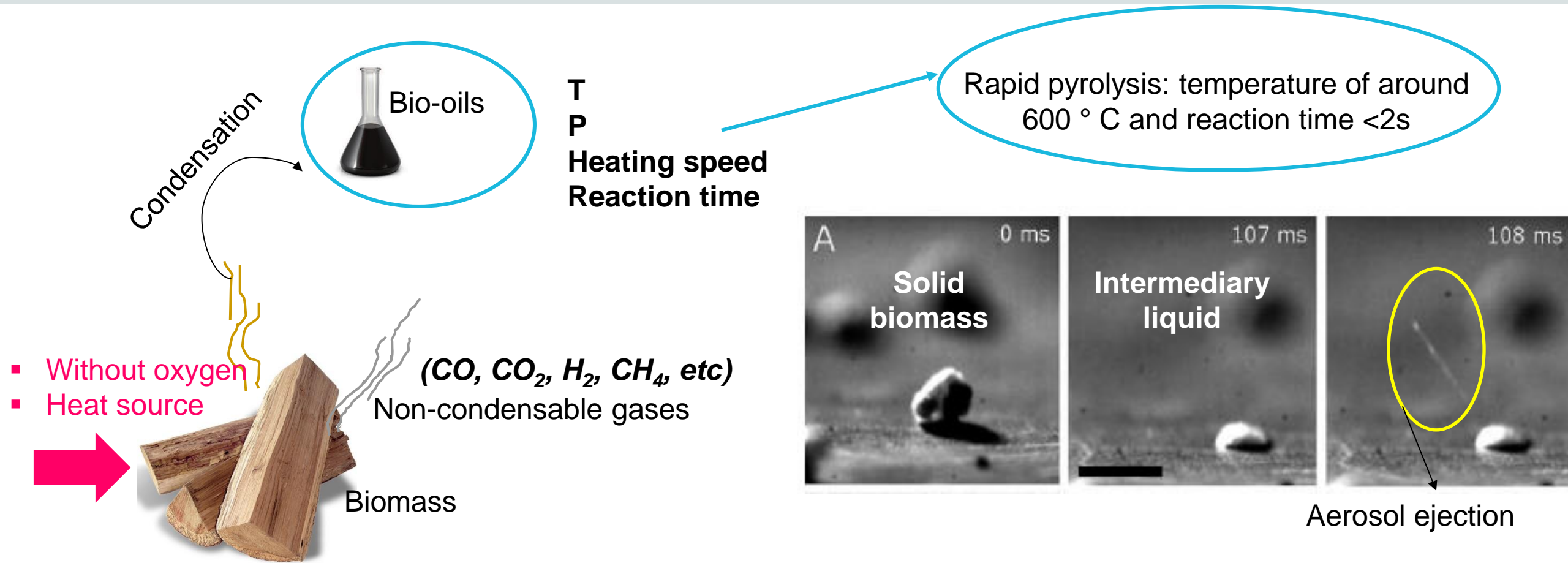
**MAKE OUR
PLANET
GREAT
AGAIN**

RAPSODEE
UMR CNRS 5302

IMT Mines Albi-Carmaux
Ecole Mines-Télécom



EXAMPLE OF A PHD IN ENVIRONMENTAL ENGINEERING



Objective: to promote the thermal recovery of highly contaminated solid organic waste in response to current and future environmental energy challenges.

Energy Engineering



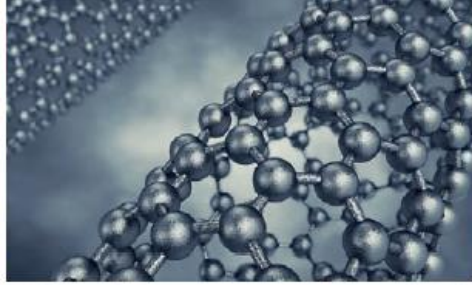
Health Engineering

Civil Engineering



Mechanical Engineering

Materials Engineering



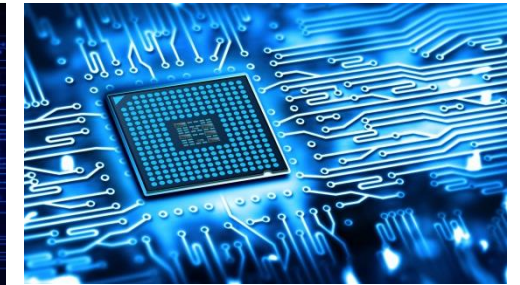
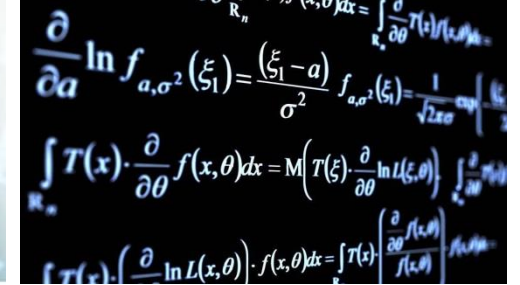
Environmental and Disaster Prevention Engineering

CS, AI



Cyber-security

Applied Mathematics

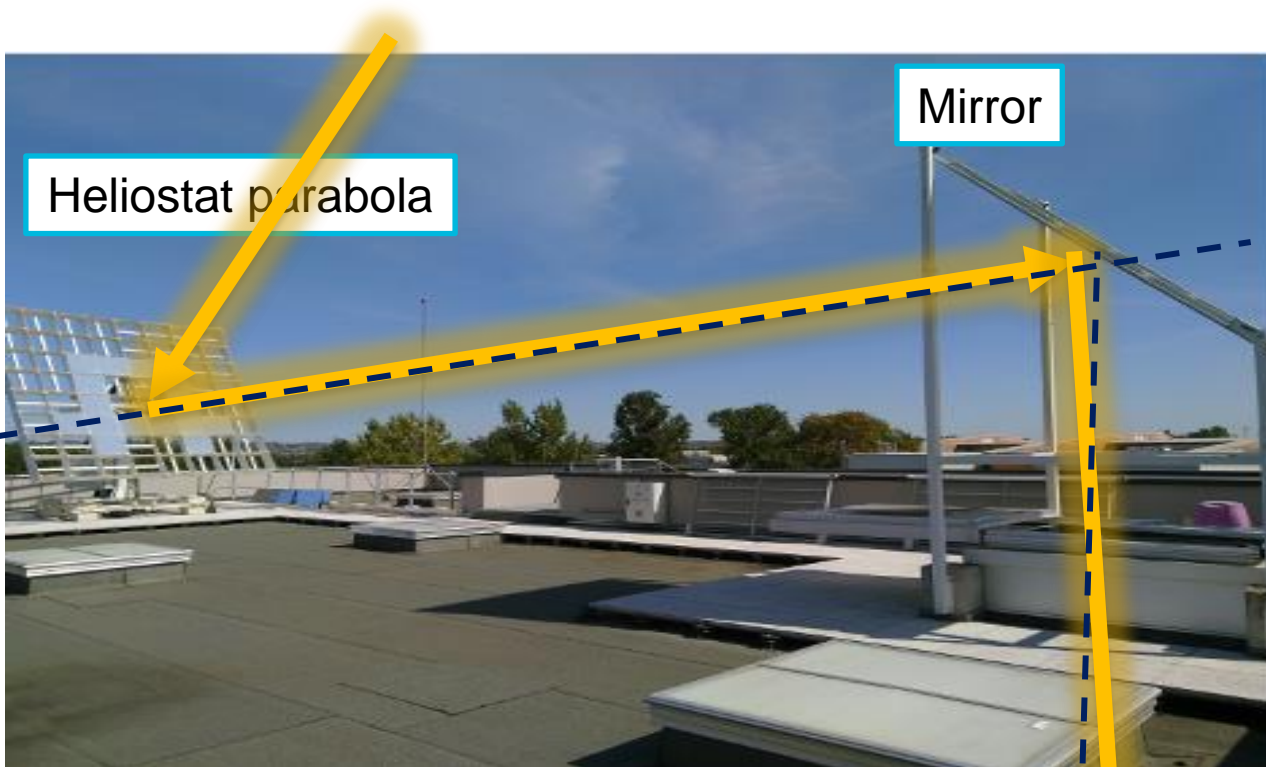


Electronics Engineering

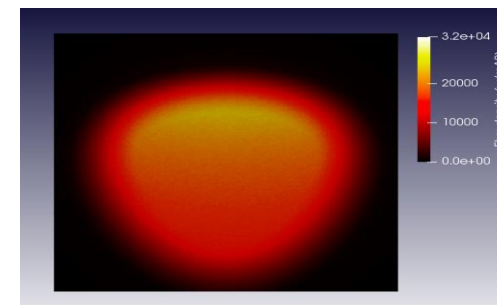
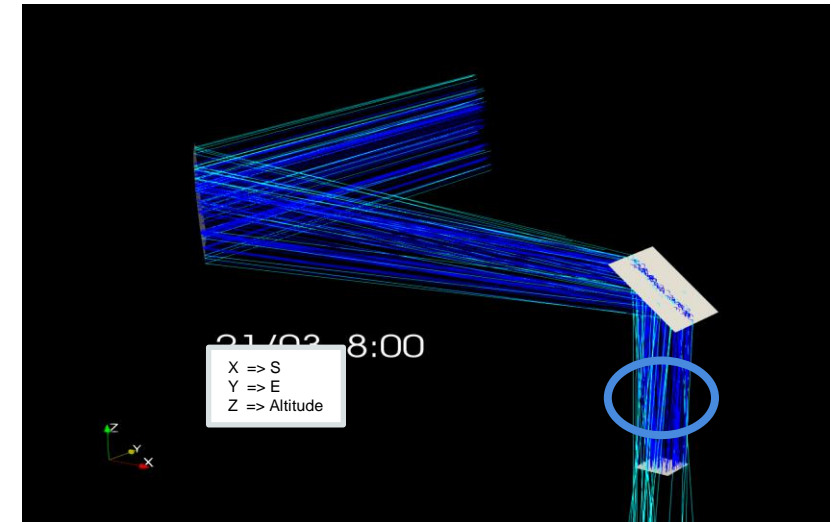
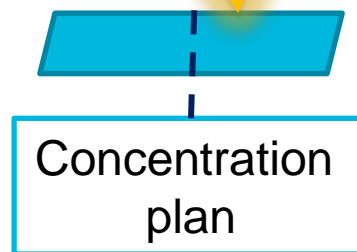
- Name: Zili He
- Nationality: Chinese
- Education: China, Sweden, France
- Subject of Phd thesis:

Adaptive optics of concentrating solar collectors

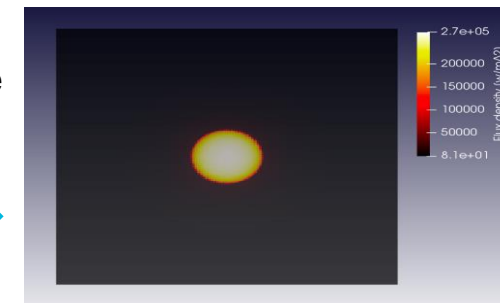




Objective: regulate parabol and mirrors to concentrate the solar flux in a process.



Adaptive optics



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- IMT Albi
- **IMT Alès (2 examples)**

4. DISCUSSION

Télécom Sud Paris

Télécom Paris

IMT Lille-Douai

IMT Business School

IMT Atlantique

IMT Atlantique

IMT Alès

IMT Mines Alès

IMT Albi

IMT Mines Albi

Mines Nancy

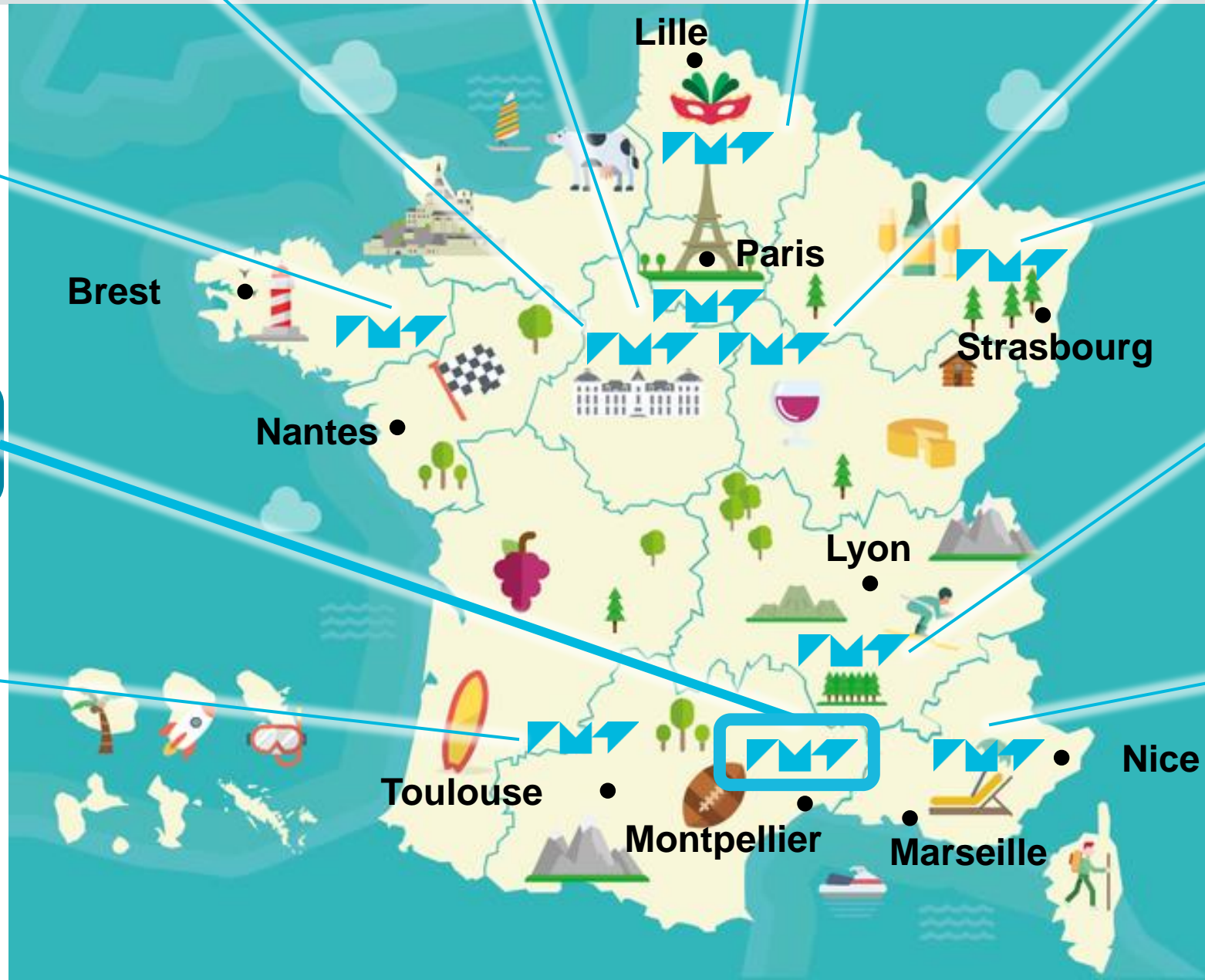
Mines Nancy (INSIC)

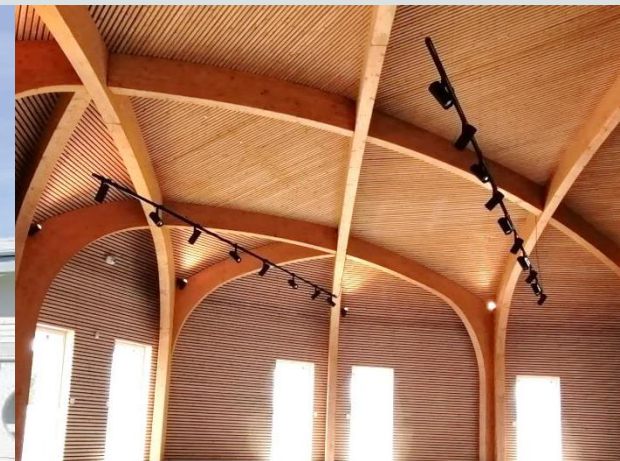
IMT Saint-Etienne

Mines Saint-Etienne

Eurecom

Eurecom





SIGHTS TO SEE (WITHIN ONE HOUR FROM ALES)

64





IMT'S TECHNICAL SPECIALTIES

66

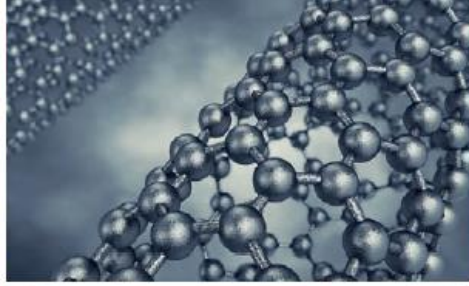
Energy Engineering



Civil Engineering



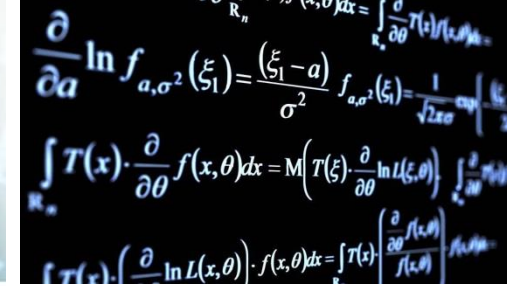
Materials Engineering



CS, AI



Applied Mathematics



Health Engineering



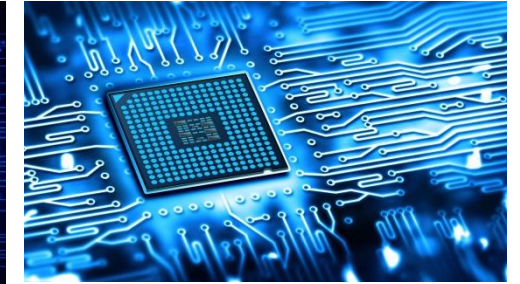
Mechanical Engineering



Disaster Prevention Engineering



Cyber-security



Electronics Engineering

EXAMPLE OF A PHD IN DISASTER PREVENTION ENGINEERING

67

- Name: Maria Molina Arteta
- Nationality: Colombian
- Education: Colombia, Spain, UK, France
- Subject of PhD thesis:

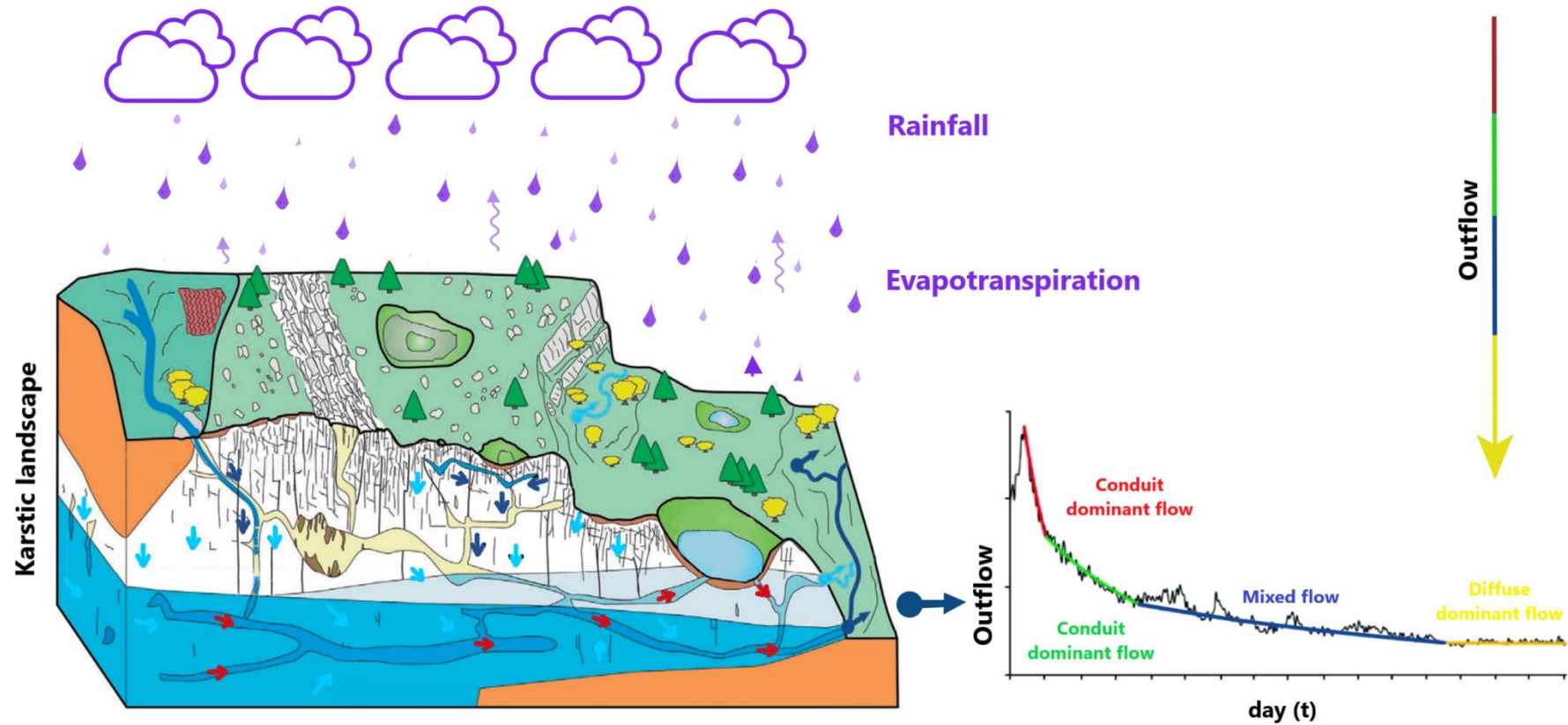
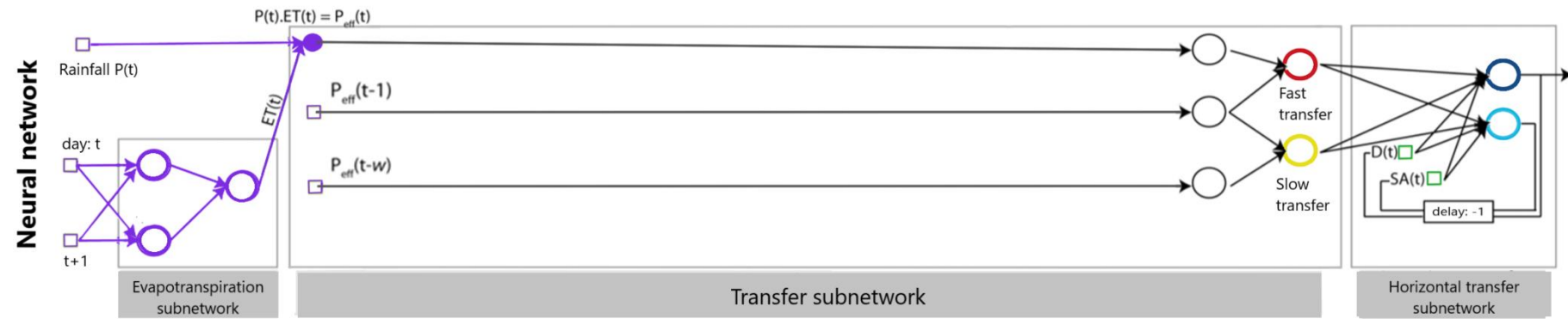
**Improving hydro meteorological forecasting using
AI neural networks.**



“Working at IMT is a rewarding experience both on a human and professional level. I am very grateful for what I’ve been able to learn in France about karstic environments and neural networks, two subjects that I would never have thought compatible before the thesis.”



EXAMPLE OF A PHD IN DISASTER PREVENTION ENGINEERING



References:

Karstic landscape: RAVBAR, N. (2013)

Neural network: JOHANNET, A. (1994) en KONG, A. (2011)

Outflow: TORRESAN, F. et al. (2020)

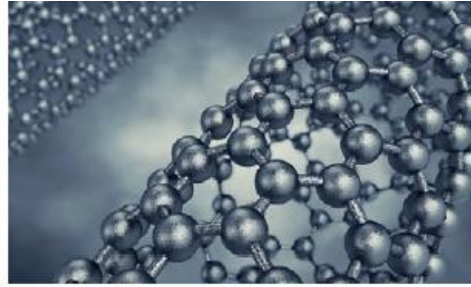
Energy
Engineering



Civil
Engineering



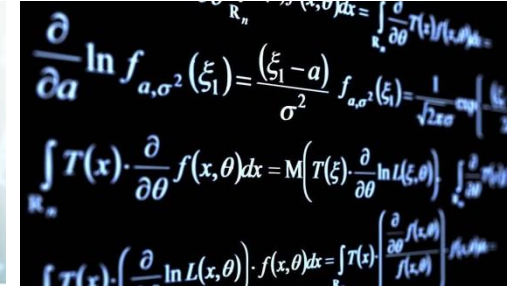
Materials
Engineering



CS, AI



Applied
Mathematics



Health
Engineering



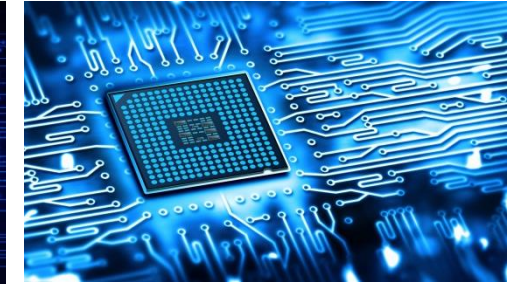
Mechanical
Engineering



Environmental
and Disaster
Prevention
Engineering



Cyber-security



Electronics
Engineering

EXAMPLE OF A PHD IN MATERIALS ENGINEERING

70

- Name: Nour Masarra
- Nationality: Lebanese
- Education: Lebanon
- Subject of PhD thesis:
**3D printing of Bio-nanocomposites
and Blend.**



EXAMPLE OF A PHD IN MATERIALS ENGINEERING

Objectives:

- Manufacturing electrically conductive plastic objects useful in the electronic domain.
- Using plastic materials that are **ecofriendly**, **biosourced**, and **biodegradable**. Due to the catastrophic plastic pollution that the whole world is suffering from, the conventional plastics are replaced by the biopolymers.



Biobased



CONTENTS



Nour Masarra

1. ABOUT IMT GROUP

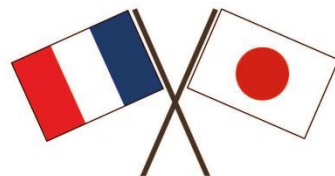
- Higher education
- Research
- Innovation

2. DOCTORAL COURSES IN THE IMT GROUP

3. FOCUS ON IMT'S THREE SCHOOLS

- IMT Atlantique
- IMT Albi
- IMT Alès

4. DISCUSSION WITH PHD STUDENT



THANK YOU FOR YOUR ATTENTION.

**If you are interested, please contact us
using the mail address below.**

Pierre Perdiguier
IMT Ales, Vice President
imt-japan@mines-ales.fr
www.imt.fr/en/

