

École des Ponts  
ParisTech



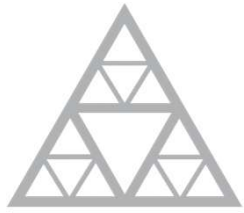
*May 2020*

**ÉCOLE DES PONTS PARISTECH**  
Building the worlds of tomorrow



# A world-class Higher Education and Research Institution

- A public engineering school recognised for the excellence of its graduate studies
- Founded in 1747
- International outlook
- A unique combination of fundamental and applied sciences, to transform business and society.
- Flexible and interdisciplinary engineering curriculum
- Leading to executive careers
- Striving for the ecological and digital transition



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# A long and prestigious history

## The oldest School of engineering in Europe

- **1747**: École nationale des ponts et chaussées founded by King Louis XV
- **1851**: First research laboratory
- **1988**: 1st Double Degree agreement with international universities
- **1997**: Relocation in Marne-la-Vallée, Green City Campus
- **2017**: National HEI Program “Inventing the City of Tomorrow”



**Henri Becquerel**  
1852-1908  
-Physicist-  
Nobel prize 1903



**Augustin Cauchy**  
1789-1857  
-Mathematician-  
One of the founders of modern analysis



**Eugène Freyssinet**  
1879-1962  
-Engineer, entrepreneur-  
The father of prestressed concrete



**Louis Ménard**  
1931-1978  
-Engineer-  
Developer of the pressiometer



**Claude-Louis-Marie-Henri Navier**  
1785-1836  
-Engineer, scientist-  
Inventor of general theory of elasticity



**Jean Résal**  
1854-1919  
-Engineer-  
Builder of the pont Mirabeau and pont Alexandre III in Paris



**Jean Tirole**  
1953-...  
-Economist-  
Nobel prize 2014



**Louis Joseph Vicat**  
1786-1861  
-Engineer-  
Inventor of concrete



# Ecole des Ponts ParisTech Alumni in industry and in government



**Elisabeth Borne**  
**Ponts 86**  
Minister of the  
Ecological Transition



**François Bertière**  
**Ponts 74**  
CEO Bouygues  
Immobilier



**Diane D'Arras**  
**Ponts 77**  
President of IWA, former  
VP SUEZ Environnement



**Fabrice Fourcade**  
**Ponts 89**  
CEO EDF China



**Antoine Frérot**  
**Ponts 82**  
CEO Véolia



**Mostafa Terrab**  
**Pont 79**  
CEO OCP Group



**Benoit de Ruffray**  
**Ponts 1993**  
CEO Eiffage



**Thibault Duchemin**  
**Ponts 2013**  
Founder AVA

# Remarkable works, designed by Ecole des Ponts ParisTech Alumni



**Viaduc Millau - Michel Virlogeux**



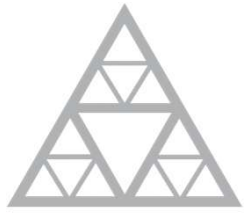
**Beijing Opera © Paul Andreu**



**Gardens by the Bay (Singapore)  
© Atelier one – passage project**



**Cristo Redentor  
Albert Caquot**



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# Rankings and certification



International QS Rankings 2020: +13 spots over last year.

#250 worldwide

#8 France



2019 THE (Times Higher Education) international ranking: +50 spots over last year.

#201-250 worldwide

#5 France / #2nd “Grande Ecole” France



l'Étudiant

National Etudiant ranking 2019:

#3 France



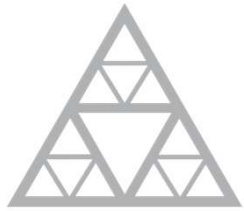
Choose France certification

Highest level of certification of welcome procedures and programmes for international students



AFAQ ISO 9001 certification

Quality management



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# International partnerships

71 partner universities

IN 35 countries

ON 4 continents

45 double-degree agreements with universities

IN 25 countries



ETH Zürich

Imperial College London



POLITECNICO DI MILANO



Americas:  
15 partner institutions  
12 double-degree agreements  
3 bilateral exchange agreements

## 4 Global Initiatives

Programme de Formation d'Ingénieurs d'Excellence - PFIEV (Vietnam)  
Co-Innovation Center (Tongji, Shanghai)  
Joint Education and Research Center (UM6P, Maroc)  
Capacity Building Program funded by the WorldBank (INP-HB, Côte d'Ivoire)

Europe:  
39 partner institutions  
19 double-degree agreements  
20 Erasmus+ exchange agreements

Asia:  
9 partner institutions  
8 double-degree agreements  
1 bilateral exchange agreement

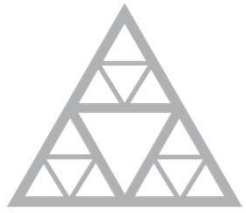


Africa and the Middle East:  
9 partner institutions  
6 double-degree agreements  
2 bilateral exchange agreements



東京大学  
The University of Tokyo





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# Governance and funding

- **State-owned institution**

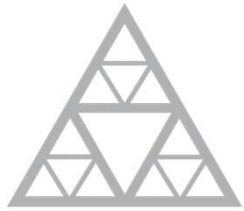
- Reports to the Ministry for the Ecological and Inclusive Transition and to the Ministry of Higher Education, Research and Innovation

- **Governing bodies:**

- Board of Directors, 24 seats, 8 for industry representatives
- Graduate School Council
- Scientific Council

- **Funding:**

- Annual budget: 47 M€
- 50% by the Ministry for the Ecological and Inclusive Transition
- 50% by industry



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## Key facts and figures

### Students :

- 870 students in the MSc in engineering / Diplôme d'ingénieur
- 130 in Master's programmes
- 300 in Advanced Master's programmes
- 500 PhD candidates and postdocs
- 200 in Business Administration programmes

i.e. a total of: **2 000** students, **25%** female

**45%** international students, **45** nationalities

**1 200** instructors (academics, researchers, business practitioners)

**12** research laboratories

**7** labs of excellence

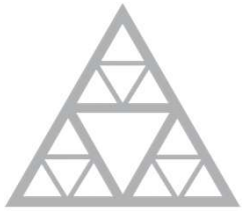
**6** EUR, **3** ERC

**1000** rank A publications, including **45%** with a foreign partner

**300** permanent scientists

**50** PhD defense / year

**14** education and research chairs



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# Close links with industry



Transportation,  
environment,  
urban services



Consulting



Energy



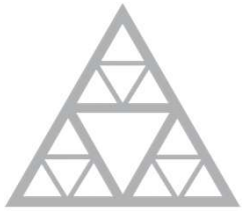
Construction



Industry



Finance

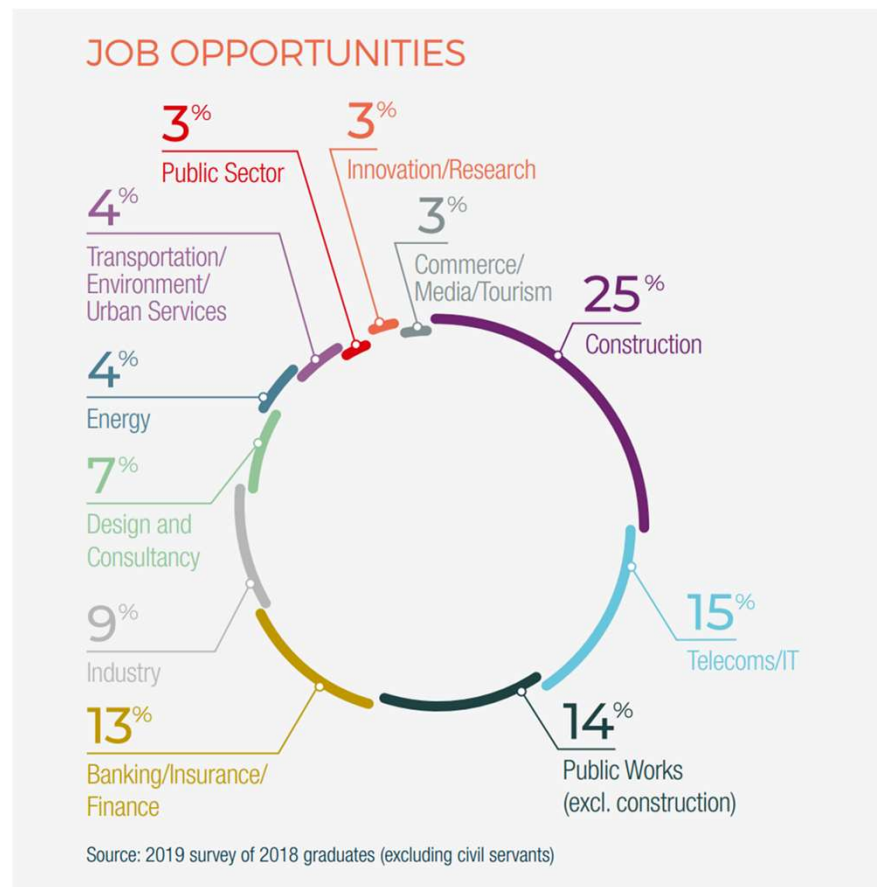


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# Careers and placement

AVERAGE SALARY  
IN FIRST JOB

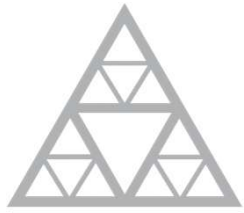
€46,900 | €52,500 with bonuses



85% of  
engineering  
students are  
hired before  
graduation

## Our fields of excellence

- Civil engineering / Environment / Transportation / Urbanism
- Applied mathematics / Computer science / Data sciences
- Mechanics / Materials Science
- Industrial engineering / Robotics / Supply Chain
- Economics / Finance / Sustainable development



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# Academics: Departments of studies

- **Civil and Structural Engineering**

Complex projects, site work organisation, innovation of new materials and construction technologies

- **City, Environment, Transportation**

Planification of complex urban systems and operation of urban services (transportation, water,...)

- **Mechanical Engineering and Material Science:**

Research and design of new products and materials in the fields of energy or transportation

- **Industrial Engineering:**

Innovation and supply chain. Robotics.

- **Economics, Management, Finance:**

Financial engineers( financial engineering, project finance, public/private partnerships) and economist engineers (urban, environment, transportation, construction and economic regulation)

- **Applied Mathematics and Computer Science:**

Modelisation of complex systems ; analysis of financial, industrial or natural risks ; challenges within big data



# Academics: Specific Engineering Areas | Departments of humanities

## Specific Engineering Areas

### Energy

Energy Transition At Local Scale, Management of energy projects, Nuclear Energy, Energy efficient buildings, Transport and Sustainable Development...

### Robotics

Mechanical engineering, Advanced Robotics, Design by Data, Industrial Systems Design & Robotics

### Data Sciences

Applied mathematics, Mathematics for Finance and Data, Mathematics, Vision, Learning, Design by Data

## Departments of Humanities

### Languages and Cultures

French as a Foreign Language Certified Center

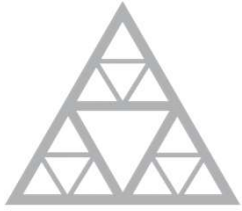


Pre-arrival seminars, intensive French courses.

17% of study time dedicated to foreign languages, 10 taught languages, study trips, debates, tandem language learning.

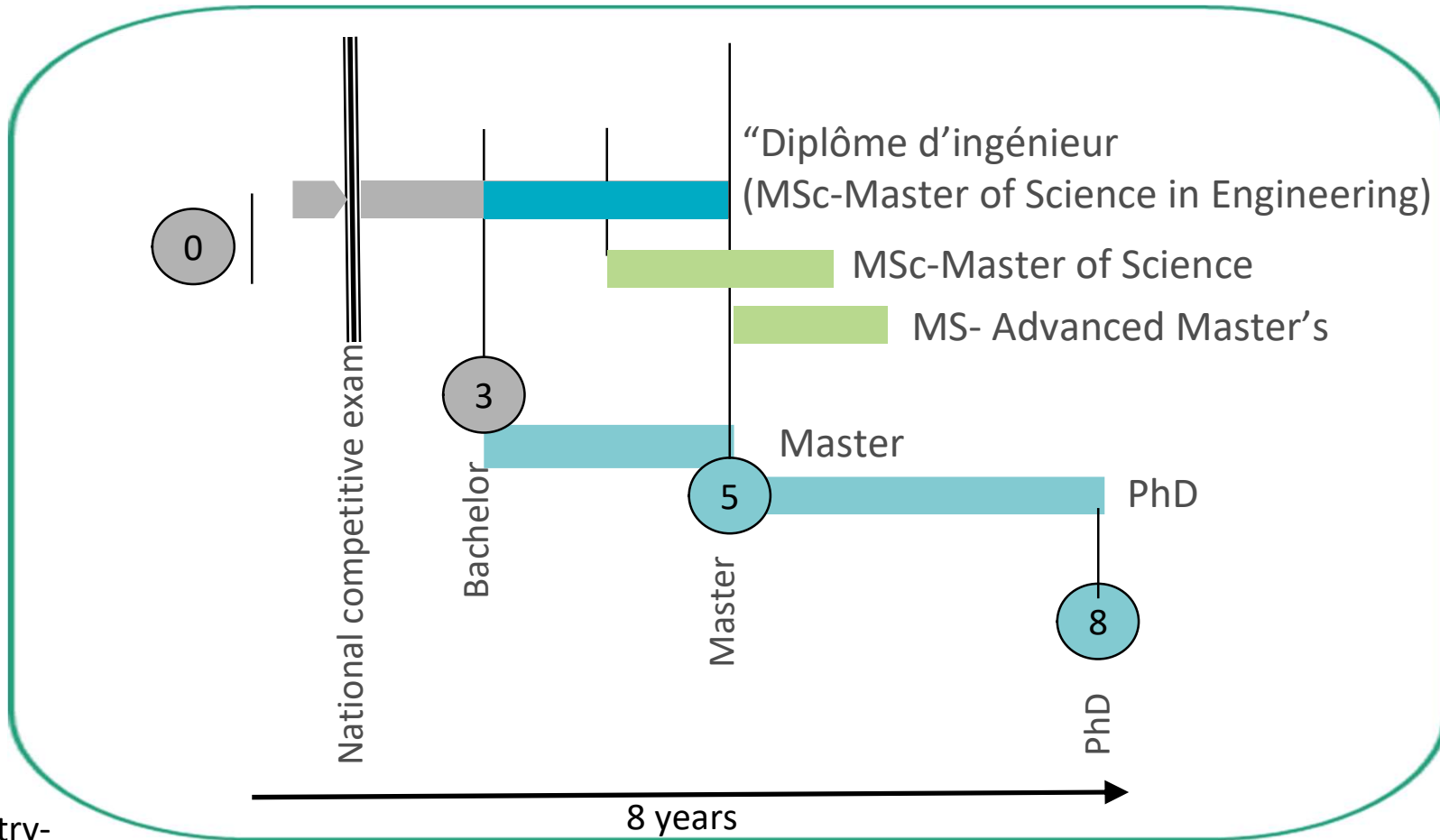
### Humanities and Social Sciences

History of engineering, Corporate communications, Sociology, Movies and Workplace



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# Academics: graduate programs



Industry-  
oriented

Academy-  
oriented

# « Diplôme d'ingénieur » (MSc in engineering)

## FIRST YEAR (Bachelor cycle – senior year)

- Consolidation of scientific and general knowledge,
- projects (research and academic)
- Work experience: the year ends with a 4 week hands-on internship in a company

## 2<sup>nd</sup> & 3<sup>rd</sup> YEAR (Master cycle)

2nd Year: choice of a Department of studies

- Civil and structural engineering
- City, environment, transportation
- Mechanical engineering and materials science
- Industrial engineering
- Economics, Management, Finance
- Applied mathematics and computer science

## Year 2 internship

- Between the 2nd and 3rd Year, **80 % of the class opt for a long internship** (1 year), more than 30 % of them abroad.
- The other students undertake a short internship in a company or research laboratory (3 months), 20% of them abroad.

## Year 3 Final Year Project (PFE)

Over minimum 4 months, students apply the skills acquired in their programme to a scientific or technical problem, in a company or research laboratory either individually or in a group (Ponts Team Project).

Courses	Courses	Internship (4 weeks)	Courses	Courses	Internship (2 months > 10 months)	Courses	Final project (4 months > 6 months)
> YEAR 1			> YEAR 2			> YEAR 3	

# « Diplôme d'ingénieur » (MSc in engineering) International students

## Bachelor cycle

At home institution

## Master cycle

At Ecole des Ponts ParisTech

> Choice of a Department of studies

- Civil and structural engineering
- City, environment, transportation
- Mechanical engineering and materials science
- Industrial engineering
- Economics, Management, Finance
- Applied mathematics and computer science

## Industrial internship

- 3 months or 1 year
- France or abroad

## Final Project / Master thesis

- For at least 4 months, students apply the skills acquired in their programme to a scientific or technical problem, in a company or research laboratory, either individually or in a group (Ponts Team Project).
- Can be done at home university

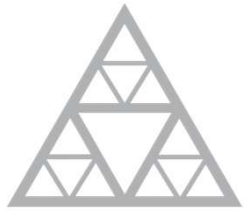


Human-sized classes

35% international

25 nationalities

Bachelor		Master courses (for RU)	Master courses	Master courses	Internship	Master courses	Final project / Master thesis
> Home university			> Ecole des Ponts ParisTech				> Ecole des Ponts or home university



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# International Master's programmes

## International masters

- Masters in Transport and Sustainable Development (TRADD)
- Master in Water, Soil and Waste Management and Treatment (GTESD)

UIMP  
Universidad Internacional  
Menéndez Pelayo

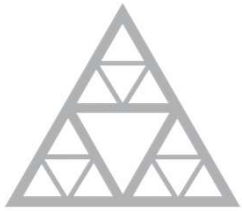


- Master Internacional en Empresa y Políticas Públicas (MIEPP)  
– institutional degree (Madrid)



## MSc

- Economic Decision and Cost Benefit Analysis (EDCBA)



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# Master's programmes

## Applied Mathematics

- Probabilities and random models (PMA)
- Mathematics of finance and data (MFD)
- Mathematics, Vision, Learning (MVA)
- Modelling, Analysis, Simulation (MAS)
- Operational Research (RO)

## Energy option

-  • Decommissioning and Waste Management (DWM)
- Energy Transition and Territories (TET)


## Mechanical Engineering

- Multiscale Analysis for Materials and Structures (AMMS)
- Durability of materials and structures (DMS)

## Civil Engineering

- Mechanics of Soils, Rocks, and Structures in their Environment (MSROE)

## Materials Science and Engineering

-  • Materials science for sustainable construction (SMCD)

## Transportation, Mobility, Networks

- Transportation, Mobility (TM)

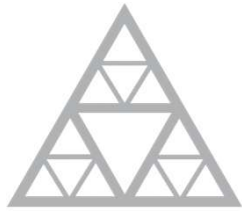
## Environmental, Energy, and

### Transportation Economics

- Environmental Economics
- Energy Economics
- Forward Modelling

## Quantitative Economics

- Analysis and Political Economy (APE)
- Public Policies and Development (PPD)



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# Advanced Master's programmes Executive Education

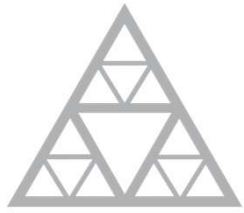


## FULL-TIME

- Planning and Urban Commissioning
- Urban Engineering and Information Technology (Urban ICT)
- European civil engineering
- Engineering of Large Energy Structures
- Public Policy for Sustainable Development

## PART-TIME

-  • **Design by Data, Computational Design, Digital Manufacturing and Building Technologies**
- Sustainable Real Estate and Building, energy transitions and digital technology
- BIM, Integrated Design and Life Cycles of Buildings and Infrastructures
- Smart Cities Engineering and Management
- Decision Support and Geolocated Information Systems
- Rail and urban transit systems
- Smart Mobility - Digital transformation of mobility systems
- Supply Chain Design & Management
-  • **Infrastructure Project Finance**
-  • **Advanced Public Action Morocco**
-  • **Management of Energy Projects**



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# PhD Programmes

- City, Transportation, and Territories
- Sciences, Engineering, and Environment
- Mathematics and ICT
- Organizations, Markets, Institutions
- Agriculture, Food, Biology, Environment and Health
- Social Science
- Environmental Sciences
- Astronomy and Astrophysics
- Mechanical, Energy, Materials Sciences and Geosciences
- Economics

English-speaking  
environment



Choose PhD@Ecole des Ponts ParisTech for:

- International perspective
- Close links with industry
- Impact on public policies and sustainable development



# Business Administration programmes

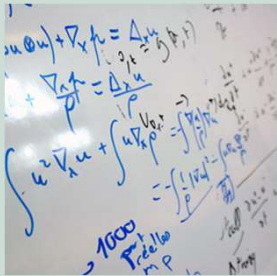



-  • Executive DBA (Paris – New York)
-  • LEADTECH Global Executive MBA (Paris – Barcelona – Singapore – Silicon Valley)
- Global Executive MBA (Casablanca)
- Executive Certificates (Africa)
-  • Executive MBA in aviation management with Tsinghua University (Beijing) 
-   • DBA –Intelligent Manufacturing Management- (Shanghai)
-  • Certificate in Innovation and Technology Management (Paris)

# Non-Degree English-taught Programmes



Full Ecole des Ponts ParisTech student experience / 1 semester / 500€/semester

Level	Topic	Academic program	Specifics
Bachelor-senior students	<b>Applied Mathematics</b> 	Mathematical tools for engineer Analysis and scientific computing Optimization Probability Introduction to programming Statistical physics Operational research and optimization Statistics & data analytics Language (French) Sport Project within lab	Bespoke academic supervision and small class teaching  Full Ecole des Ponts ParisTech student and research experience
Graduate students	<b>Green Finance</b> 	Physics of climate change Energy economics ESG analysis Green financing Conferences Credit Risk Management of Climate Risks Project Finance Life Cycle Analysis Capstone Projects	Extension to 1 semester of research at CIRED laboratory

# An entrepreneurial ecosystem for students

- Entrepreneurship courses
- 3 incubators (Descartes, GreenTech and Station F)
- Annual Hackathon: « One night to launch a startup »
- Access to research equipment and mentorship
- Special awards, and seed-funds from Fondation des Ponts



## Successful start-ups



Daylight system  
with fiber optic



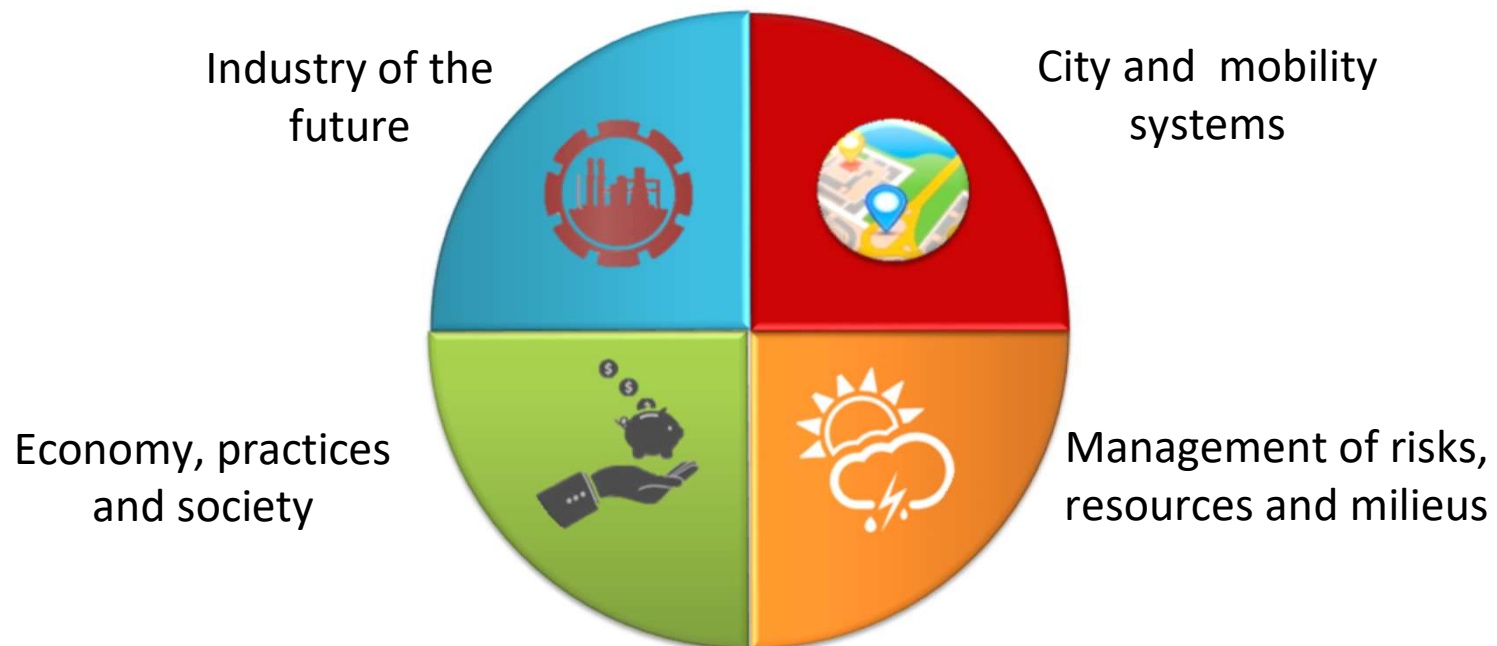
Roof mounted  
small wind turbine



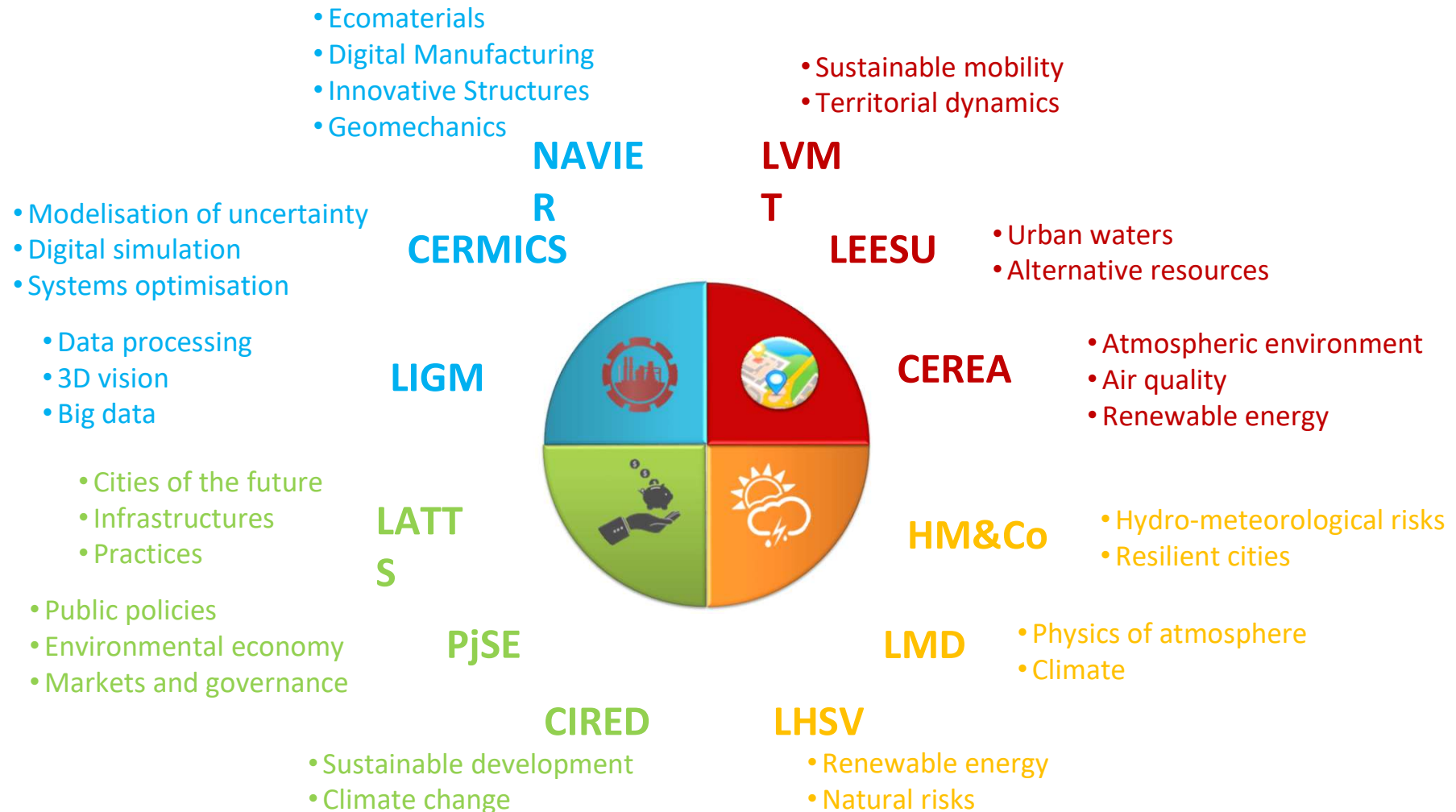
From 2D to 3D

# Research for the ecological and digital transition

A challenge-based approach to address 4 socio-economic issues of sustainable development



# Research for the ecological and digital transition



# Research for the ecological and digital transition

- Predictive Maintenance



➤ Industry 4.0: how to use data to enhance competitiveness



# Research for the ecological and digital transition

- **Renewable Energy**

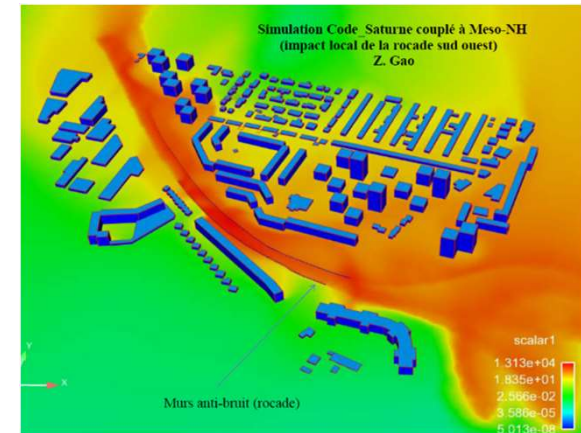


- Onshore and offshore marine energy
- Wind farms and solar
- Smart grids



# Research for the ecological and digital transition

- Resilient Cities: mobility, water, air.



- Smart & Sustainable Mobility



- Extreme rains



- Air Quality



# Research for the ecological and digital transition

- Sustainable buildings and infrastructures

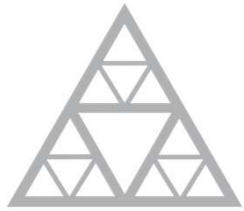


- Ecodesign of buildings and infrastructures

- Materials Science for Sustainable Construction

- Green roof performance





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# The Co-Innovation Lab

Collaborative platforms improving transfer to industry



**Fresnel** : multi-scale observation and modelling platform for resilient cities

*X-band dual polarisation weather radar, lidars, disdrometer...*

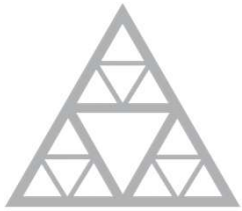
**Build'In** : building systems and artificial intelligence, materials and structures optimisation, industrial processes

*Robotic hall, large-scale additive manufacturing unit, concrete and composite materials modelling*

...

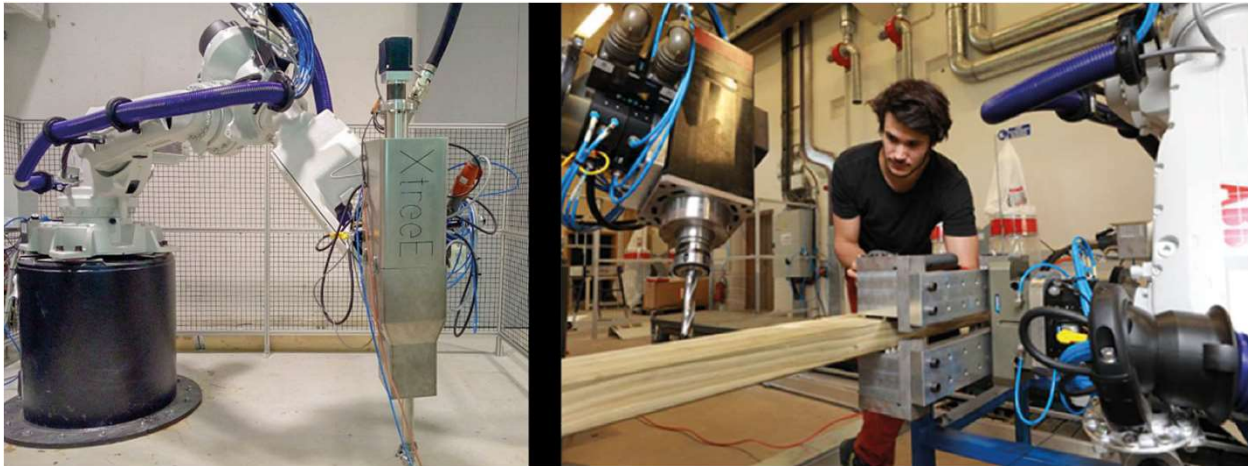
**M $\mu$**  : urban mobility modelling, new behaviors, infrastructures and urban planning, impact of public policies

*Softwares, traffic simulators...*



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# Maker space | d.school



## Makerspace

- 3D Printing,
- Laser cut
- 4 poles (ceramic, wood, steel, water, electronics)

**d.School**

**Paris**

Design Thinking as  
an approach to  
innovation and its  
management

**56** CORPORATE

PARTNERS

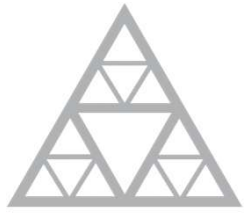
**74** PROFESSIONAL

PROJECTS

**100** ALUMNI  
EXPERTS



- innovate – collaborate – share -



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# Library, Heritage and Publishing.

## La Source, Learning Center

- 250 seats
- 200 000 documents
- Open 71 hours/week

## Scientific information services for researchers

- 25 000 scientific publications
- HAL ENPC Open Science Plan (65% publications in open access)

## Archives

- Exceptional heritage
- Ancient manuscripts and maps since the 18<sup>th</sup> century.



## Presse des Ponts

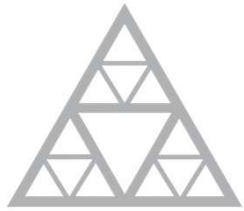
- 220 books and scientific and technical software applications primarily in the fields of civil and structural engineering, and spatial planning

# Campus Cité Descartes Greater Paris green cluster



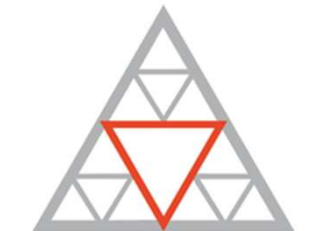
- Housing (on campus or in Paris center)
- Sport facilities
- Vibrant campus life
- 15 student societies
- 20' from Paris center (direct urban train)
- International students welcome desk with « Feel Français »





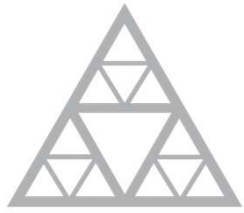
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# Alumni endowment and support



Fondation des Ponts

- 22 000 alumni worldwide, holding leadership positions in 100 countries
  - 14 international groups
  - Bespoke mentoring for international students over their stay in France
  - Support for careers and internships
- 
- Special scholarships program for international students
  - Scholarships from corporate donors (Meridiam, OCP Group, LafargeHolcim, Saint-Gobain, Veolia)
  - Excellence awards
  - A powerful network of donors



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[www.enpc.fr/en](http://www.enpc.fr/en)

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Building the worlds of tomorrow