STATISTICS FOR SMART DATA

MSc
IN
ENGLISH

ENSAI

THE NATIONAL SCHOOL
FOR STATISTICS AND DATA
ANALYSIS IN FRANCE

"Rather than worrying about Big Data, companies would do well to instead focus on Smart Data"

Bernard Marr, Advanced Performance Institute

ENSAI's program goes beyond Big Data; it has shifted its emphasis to Smart Data, thus meeting the vital challenge of smart sensing and smart processing of the plethora of data available. Smart Data focuses on revealing the **Value** and **Veracity** from the Volume, Variety and Velocity of Big Data.

Thanks to ENSAI's renowned expertise in Data Science and its innovative approach in training specialists to process and analyze data, strong links have been built with the professional world and graduates are highly sought after. This unique program is taught entirely in English.

CALENDAR AND PROGRAM

The program includes **one semester of coursework at ENSAI,** which is followed by a four to six-month paid internship in France or abroad within the professional world or academia/ research laboratories.

	Semester 1	Semester 2
August	**September through February**	**Starting in March**
Intensive French Summer Program*	**Courses, Projects, Professional Lectures** 30 credits	**Internship (4 to 6 months)** 30 credits

* An intensive French program for non-French speakers precedes the program. These students also benefit from French classes throughout the academic year.

A WORD FROM THE HEAD OF THE PROGRAM

HEAD OF THE STATISTICS FOR SMART DATA PROGRAM AT ENSAI

"Many Master's degrees in Data Science have emerged in this era of Big Data, most of which are highly IT oriented. ENSAI, the most specialized Graduate School in Statistics in France, has naturally chosen a different path. Students learn not only the latest in Computer Science technology; they are also trained to deeply understand the mass of data and to master algorithms and statistical modeling skills that are essential to identifying relevant and valuable information."

Valentin PATILEA, Professor of Statistics

TESTIMONIALS

Arnaud LAROCHE

Associate

ERNST & YOUNG ADVISORY

"Data Scientists educated at ENSAI possess the essential skills for Big Data projects. As mathematicians, they choose, adapt, and apply various approaches from the fields of Statistics and Artificial Intelligence to extract value from the data being exploited. As computer scientists, they identify pertinent data from information systems, program algorithms to exploit them, and help design infrastructure that will make rapid use of the results obtained. As experts in their field, their analyses seek to promote efficiency and profitability in businesses. They enrich dialogue with the process managers they accompany, going beyond the simple role of technical experts; they also focus on how their work impacts the overall business of the company."

COURSE OBJECTIVES

Students will

- Learn the methodological aspects and the practical skills needed to become a Data Scientist in order to meet the growing needs of a large variety of industrial and service companies and organizations in fields such as retail, manufacturing, financial markets, insurance, healthcare, energy, and public administration.
- Acquire the core concepts of data management, the necessary tools to access, handle, and analyze massive amounts of heterogeneous data.
- Master the mathematical models and algorithms vital for rapidly extracting information from data.
- Develop knowledge for deep understanding of data, creating insight.

ENSAI

CURRICULUM

Semester 1

Statistical Models for Dependent Data (60h)
Inhomogeneous Markov Models & Applications
Graphical Models & Dynamic Networks
Dynamic Data Visualization

Machine Learning (60h)
Features Selection & Regularization Methods
Deep Learning
Parallel Computing with R & Python

Smart Sensing (60h)
Foundations of Smart Sensing
Advanced Topics in Smart Sensing

Models for Complex Data (60h)
High-Dimensional Time Series
Functional Data Analysis

IT Tools (60h)
IT Tools 1 (GNU Linux & Shell Scripting, Hadoop & Cloud Computing)
IT Tools 2 (NoSQL, Spark)

Challenges for Smart Society (60h)
Energy Transitions: Quantitative Aspects
Smart Data Project
Topics & Case Studies in Data Science

Semester 2: Internship*

4-6 month professional experience followed by final report and jury defense

* If the internship is carried out in France, by law it must be paid.

SOME OF OUR PARTNERS

Jean ANDRÉ

Operations Research
& Data Science Team Manager
AIR LIQUIDE

"Students trained at ENSAI bring an applied vision to data, an expertise that industrial companies crave. For example, Air Liquide is very involved in the development of Smart Data for new energies like hydrogen or biogas. In addition to the volume of data, the multiplication and variety of sources highlight the need for 'Smart Data Scientists'. They must be capable of selecting, connecting, and merging data, and re-working them in order to construct relevant explanatory variables that will later be used in predictive models. Thanks to these models, 'Smart Data Scientists' can create value by proposing adequate prescriptive action."

Maximilian KAISER

Student from Germany
CLASS OF 2018

"The curriculum of the Statistics in Smart Data Master program is incredibly dense. You will learn a wide array of cutting edge techniques while gaining in-depth knowledge in key data science topics. This will prepare you for further academic ambitions like a PhD or for a job in the ever evolving world of data science numerous industries. Where most programs only focus on machine learning and statistical models, ENSAI will provide you with the necessary tools and capabilities for the entire modeling process: from infrastructure set up and requirement assessments to presenting the results, you will be exposed to every part of the data science pipeline thanks to engaging experts in their fields. The teaching and exam style is result-driven around projects, which allows you to work in a team with the other diverse students, further honing the soft skills that are important to modern employers. And on top of all that, you get to spend your time studying in beautiful Bretagne."

Jan VAN WYK DE VRIES

Student from South Africa
CLASS OF 2018

"The Master in Statistics for Smart Data was a natural choice for me to take a break from working and resume studies in a foreign country, at a leading institution.
Though very dense, the program provides an excellent overview of cutting edge statistical techniques and the associated software to address both Big as well as Smart Data problems. Classes are often taught by industry experts and rich with real world examples of how the specific techniques are applied. In a few examples the subject is such a recent and active field that further research opportunities are discussed and internships offered on the spot – such is the ENSAI standard".

STRONG LINKS WITH THE PROFESSIONAL WORLD

- A program involving numerous projects supervised by professionals
- The annual ENSAI Business Forum with over 60 participants, from start-ups to large groups, to help students find an internship and/or a future job
- The ENSAI Career Center, an online tool to help students kick start their future careers

JOBTEASER.COM

PROFESSIONS

Graduates of the program are skilled Data Scientists

In addition to **doctoral possibilities** in research, graduates have numerous career opportunities in international corporations and data start-ups in many fields including:

- **Business Analytics**
- **Internet of Things**
- **Personalized Medicine**
- **Smart Grid Optimization**
- **Smart Society**
- **Social Networks Analysis**
- **Supply Chain Optimization**
- **Artificial Intelligence**

AIR LIQUIDE Creative Oxygen · Amaris · BNP PARIBAS Personal Finance · Crédit Agricole · Keyrus Biopharma · Microsoft · orange · RTE Le réseau de l'intelligence électrique · SOCIETE GENERALE · SANOFI · SNCF · EY Building a better working world

WHY ENSAI?

Reputation

ENSAI is France's top graduate school for Data Science (one of the prestigious French *Grandes Écoles*) with cutting-edge expertise in Statistics, Computer Science, and Economics. Renowned researchers from France and abroad assure high-quality teaching.

High Employment

Thanks to the renown of the school, ENSAI alumni are highly sought after by employers in the private and public sectors. Its highly-skilled graduates enjoy an exceptional employment rate.

Human Scale

The small student body for this MSc program receives a personalized welcome, and ENSAI's faculty members and researchers from partners are readily available for students.

International Vision

Partnerships with prominent institutions around the world have been fostered to prepare students for international careers (eg. Humboldt-Universität zu Berlin, University of Warwick, Tongji University, East China Normal University, Beijing Normal University, Colorado State University).

STRONG POINTS OF THE PROGRAM

- **Explores a unique field where Statistics, Applied Mathematics, and Computer Science converge**
- **Addresses practical, real-world issues and provides a solid theoretical background**
- **Prepares for a career with rapidly-increasing employment worldwide**

IT TOOLS

Cloud Computing
Hadoop, NoSQL, Spark
Python, R

ACCREDITATION

French Ministry of Higher Education and Research

TESTIMONIAL

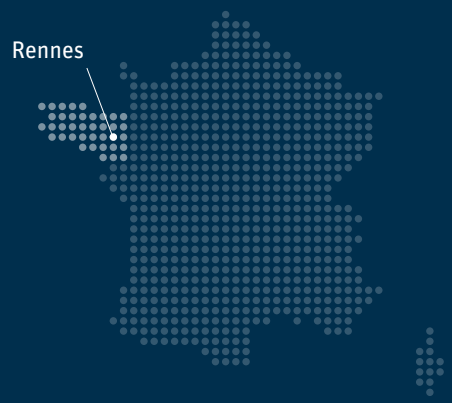
Christelle VIGNON

Student from Côte d'Ivoire - **CLASS OF 2018**

"When people ask me about the MSc in Statistics for Smart Data at ENSAI, one word comes to mind: deep. Indeed, during the 6-month academic portion of the program, I went even deeper into Statistics, which was a substantial part of my background at the beginning. The practical courses also allowed me to develop a deep understanding of machine learning techniques, as well as other major tools that constitute the Big Data ecosystem nowadays. All this knowledge, acquired in a very short time, has undoubtedly made me more competitive on the job market."

LOCATION

ENSAI is located on the Ker Lann Campus, near the cosmopolitan city of Rennes, France. Only 90 minutes from Paris by train, Rennes is known for its many cultural events and festivals, as well as being a lively student city with two major universities and a number of graduate schools. Rennes is the capital of Brittany, a region renowned for some of France's most spectacular coastline and landscapes.



ACCOMMODATION

All Ker Lann Campus residence halls are open to ENSAI students
→ **www.campuskerlann.com/categorie/logement**

Many of ENSAI's foreign students are warmly welcomed at Résidence Univercity.

Foreigners who follow the intensive summer French program are hosted within families.

COST

- 8,000 € (includes tuition, registration, and fees for entire program)
- + 1,000 € for intensive Summer French program (for foreigners not possessing B2 CEFR minimum level in French)

N.B. Possibility for reduction in program cost for applicants from partner institutions

COST OF LIVING

Estimated monthly expenses: €600-€900

€25 - €35 Smartphone / Data plan	€200 - €350 Rent (net)	€35 Electricity	€250 - €350 Food	€30 Public transportation	€50 - €100 Other expenses
	€400 - €550 (+ security deposit equal to one month's rent), minus roughly €200 (French rent subsidies: CAF)		(on-campus student lunch meals: €3)		(laundry, clothing, entertainment, etc)

ADMISSION AND LANGUAGE REQUIREMENTS

- All applicants must have a minimum of 4 years of higher education (at least a 4-year BSc, or the first year of an MSc). Strong mathematical background and advanced computer science knowledge are required.
- Applications are pre-selected based on candidates' degrees, level, and skills. Final admission is granted following a personal interview (in person or via videoconference).
- **Language 1: English** (all coursework and examinations)
  - Minimum level of B2 CEFR
  - Common certificates accepted (eg. TOEIC, TOEFL, IELTS, Cambridge CAE)
- **Language 2: French** (practical life)
  - No minimum level required.

→ Full procedures, applications and deadlines available at www.ensai.fr under "Admission › MSc in Statistics for Smart Data"

ENSAI

CONTACT

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