## Mathematics at the École Normale Supérieure

ÉCOLE NORMALE SUPÉRIEURE

"To rise above oneself and to grasp the world"

Archimedes

CAREER PATHS

STUDEN FEEDBAG

# The École Normale Supérieure (ENS)

### A WORLD-CLASS UNIVERSITY BUILT ON FRENCH EXCELLENCE IN EDUCATION

Established in 1794, the ENS is one of *France*'s most prestigious and selective institutions of higher learning and research in the arts and sciences, located in the heart of one of the world's greatest cities. It has trained generations of the world's most successful academic, research, business and civic leaders and continues to build on its heritage of intellectual innovation and excellence. Some of the most important names in the world's scientific and cultural achievements *- Henri Bergson, Évariste Galois, Jacques Hadamard, Louis Pasteur, Jean-Paul Sartre* - made their intellectual start at the ENS. The ENS's focus on research, interdisciplinary training, and intellectual creativity sets it apart from *France*'s other elite *Grandes Écoles* and allows it to attract the most accomplished students and professors from *France* and around the world.

### 2700 students 1500 faculty (teaching and research) 35 centers of research excellence 300 foreign students from over 46 countries 200 math students 10 Fields Medal winners 12 Nobel Prize winners

### Studying at the ENS

### **Developing Multidisciplinary Expertise**

The ENS continues its proud tradition of training students to become leaders capable of bringing their creative vision and innovative solutions to bear on the increasingly complex and global issues of today's world. It does this by assembling the world's most distinguished experts to teach its students to conduct pioneering research that transcends the traditional boundaries between academic disciplines.





↑ A student room

<sup>ee</sup> THE ENS IS THE ONLY SCHOOL IN FRANCE THAT TRULY INTEGRATES THE SCIENCES AND THE HUMANITIES...<sup>99</sup> DAVID BESSIS

STUDYING AT THE ENS

### Mathematics at the École Normale Supérieure ENS DMA 2013 5

In addition to the required courses in their fields, students are actively encouraged to explore other disciplines to achieve new insights into their own research. Students work with tutors and academic advisers to develop individualized study programs that are suited to their interests and needs. The school provides a rich menu of seminars and study groups to supplement a student's main academic

curriculum. Students also have the opportunity to conduct independent study programs away from the ENS on projects that are

sometimes completely unrelated to their academic area of focus, whether it's writing, film-making, music, learning a new language or international field work. All of this is based upon the school's fundamental belief in the creative power of multidisciplinary learning.

ENS students are trained to be international experts, ready to work anywhere in the world. Immersed in the cosmopolitan character of a world capital like *Paris*, they are very quickly initiated into the benefits of diversity and strongly encouraged to widen their horizons

with new languages and study abroad. Thanks to the ENS's extensive international network of alumni and academic partnerships, ENS students can work or study wherever they choose. For example, ENS graduates now teach at *Berkeley, Columbia, Harvard, the Institute of* 

**Next-Generation Global Leaders** 

Mathematics at Beijing University, MIT and Oxford.



<sup>99</sup> WHAT TOUCHED ME MOST ABOUT THE ENS WAS THE TRUST AND SUPPORT FROM OUR TEACHERS <sup>99</sup>



### Superlative Education in a Personalized Setting

Unlike larger universities, the ENS provides an intimate setting for students and teachers to live, work, and socialize together. The school's relatively small size and large teacher-to-student ratio mean that each student receives individual attention and easy access to professors. All students live on campus at least during their first year. They also take their meals together in on-campus dining halls and can avail themselves of a variety of campus facilities, including computer labs, a movie theater, music and dance practice spaces, dark rooms for photography, tennis courts and gymnasiums. This creates a tight-knit community of students and teachers from diverse backgrounds and with different interests who learn from each other. In addition to academic counseling, new students are paired with older students who help them navigate their new surroundings and begin lifelong friendships. A variety of active student clubs and associations means that it is not unusual to find physicists joining philosophers at film showings, geographers dancing with classicists, musicologists bumping into computer scientists at the photography lab, or economists facing off with archaeologists in rugby matches! And of course, the city of Paris awaits beyond the school's formal boundaries, with its surfeit of cultural and academic offerings.

## **Campus** Life

"To study in Paris is to be born in Paris.

Victor Hugo

### <sup>PP</sup> THE ENS'S LOCATION IN THE MIDDLE OF THE LATIN QUARTER IS AN AMAZING ASSET <sup>P9</sup> ALEXANDRE MARTIN

### STUDYING AT THE ENS

CAMPUS LIFE

MATH AT THE ENS

### Studying in the City of Light

*Paris* has been an intellectual center for centuries, with a remarkable concentration of poets, philosophers and scientists gathering there during the 18<sup>th</sup> century Age of Enlightenment. That cultural and intellectual tradition continues to this day and remains central to the city's enduring appeal for students and teachers alike. In 2012 *Paris* was named the best city in the world for students by *QS World University Rankings*, based on the quality of life and educational offerings.

↑ Dances at ENS

The ENS is surrounded by top universities and research institutes like *the Sorbonne, the Collège de France,* and *the Curie Institute.* Students are spoiled for choice with some of the best cultural offerings in the world: museums like the *Louvre,* the *Musée d'Orsay,* and *Pompidou Center* as well as opera houses, concert halls, countless cinemas, historical theaters and cafés.

The school is located in the heart of *Paris*' traditional student area, *the Latin Quarter*, whose name refers to its origins as a student haven when Latin was the universal language of learning. This is one of the most vibrant parts of *Paris*, filled with interesting restaurants of every ethnic origin, cafés, cinémas, dance clubs and bookstores. *Paris* is a feast for the eyes, the mind and the soul.

CAREER PATHS

### STUDYING AT THE ENS

### A Curriculum Cultivating Innovation and Creativity

International students studying pure and applied math at the ENS follow a three-year program working toward a master's degree and possibly continuing on to their doctoral degree. Most doctoral students will receive a three-year teaching scholarship to support their doctoral studies. As with all courses of study at the ENS, the emphasis in the math department is on training by research and on providing a broad range of specialties within mathematics and beyond. Whether you're interested in algebraic geometry or stochastic calculus - or anything else - you will find an unparalleled concentration of mathematical talent to help you develop your expertise.

→ The Math and Computer Science Library

### **Greater Paris as a Center of Mathematics**

*France* has a long and proud tradition in mathematics. The century of *Louis XIV* was also that of *Descartes, Fermat* and *Pascal.* Today greater *Paris* has the largest concentration of mathematicians in the world, with more than 1,000 researchers breaking new ground in pure and applied mathematics.

The Paris Mathematical Sciences Foundation (FSMP) and the Jacques Hadamard Mathematical Foundation (FMJH) bring together a number of mathematical research institutions in Paris, including the ENS, Pierre and Marie Curie University (UPMC), Paris-Diderot University, the National Center for Scientific Research (CNRS), Paris-Dauphine University, the Collège de France, the Orsay University, the Institut des Hautes Études Scientifiques (IHES), the École Polytechnique, Paris-Descartes University and Paris-Nord University. The foundations fund programs to attract the international elite, support the mathematicians of tomorrow and take mathematical research to a new level of excellence. This effort is firmly supported by the French government, which recognizes the strategic importance of investing in the country's unique capabilities in math.

### **International Distinctions**

Mathematicians who trained at the ENS have received more Fields Medals, mathematics' highest award, than those from any other institution. Since 1936, when the award was first introduced, 10 of the 53 recipients have come from the ENS, and many of them are still working in Paris:



 $\Lambda$  A tutorial on knots and links

Cédric VILLANI (2010)

Bảo Châu NGÔ (2010)

Wendelin WERNER (2006)

Pierre-Louis LIONS (1994)

Jean-Pierre SERRE (1954)

Laurent SCHWARTZ (1950)

Alain CONNES (1982)

René THOM (1958)

Laurent LAFFORGUE (2002)

Jean-Christophe YOCCOZ (1994)



**Mathematics** 

at the ENS

### DAVID WASZEK / STUDENT

"What drew me to the ENS was its intellectual freedom: all disciplines are available, and each student has enormous freedom in designing a curriculum. After obtaining under-graduate degrees in classics and math, and a master's



degree in philosophy, I'm currently working on on a master's degree in math at Cambridge University through an exchange with the ENS. However, this tremendous freedom does not mean that you are left totally on your own: thanks to the small size of the ENS, I've always had the good fortune to find teachers who knew me well enough to really listen to me, advise me or warn me. But the intellectual opportunities the ENS gave me go far beyond the mere freedom

> to choose my courses and degrees freely. The greatest riches of the ENS are, for me, the students: the way the dormitories and student life are organized allowed me to meet many remarkable people from all different fields and, thanks to them, to get to know their work and their perspectives up close. Now I know I can make a fully informed decision about the field I go into, whether it's the philosophy of science, mathematics or any other discipline."

<sup>99</sup> WHAT I OWE MOST TO THE ENS IS THAT IT TAUGHT ME TO MAKE MY OWN CHOICES...<sup>99</sup> FAROUK BOUCEKKINE

### ALEXANDRE MARTIN / STUDENT

"If one thing is clear about the ENS, it's that it gives its students nearly total freedom to choose their own paths. I wanted to devote myself entirely to mathematics, so the ENS was a kind of paradise for me. In addition to my regular classes, I was able to meet researchers who helped me sort through my choices, which turned out to be an

numerous opportunities offered by living in the heart of Paris."

extraordinary bit of luck for me. Since I'd arrived at the ENS with a fairly precise idea of the sort of mathematics that I wanted to go into, it was great to be able to count on a tutor to put me in contact with foreign mathematicians whose research fields corresponded to my own interests. This is how I managed to spend five months in Edinburgh while writing my master's thesis. I was also able to find my future PhD advisor and move to Strasbourg, where I have since begun a dissertation in topology and in geometric group theory. Finally,

in addition to the academic benefits, the ENS's location in the middle of the Latin Quarter is an amazing asset, so you can have an exceptional course of study combined with the

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### NICOLAS CURIEN / TEACHING ASSISTANT

"I was a student at the ENS and stayed on as a teaching assistant (TA) because I like studying and teaching. I've never regretted my choice!

I have wonderful memories of my student years at the ENS: freedom, diverse course offerings, high-quality education and life in one of the most interesting parts of Paris. I **was able to try out a lot of different fields like physics, economics, biology and a great variety of mathematics** before I decided to focus on probabilities. As I started my PhD, I was offered a teaching position as a tutor for the probabilities team in the math department. That means I'm now on the other side of the desk so to speak. There are currently seven TAs in the math department, mostly in charge of the seminars for first-year students. It's a pleasure but also a bit daunting to be in front of a roomful of bright ENS students who aren't shy about asking the mathematically difficult questions, the same questions we ourselves posed a few years ago as students! But as young alumni and future researchers, we are also intermediaries between the professors and the students. We consider our students as our future colleagues and the relatively small size of the classes makes it possible for us to attend to students individually: every professor/researcher/working group teacher acts as a tutor for a small number of students."

par defention

#### JIE LIN / FROM TSINGHUA UNIVERSITY, BEIJING (CHINA), 3RD YEAR ENS STUDENT

"When one of the best students in my high school in Shanghai, China, was admitted to the ENS seven years ago, my math teacher was so happy he carefully wrote the name of the École Normale Supérieure on the blackboard and told us the school had the best mathematics department in the world. That was the first time I heard of the ENS. When I was in the math department at Tsinghua University, I discovered that the ENS had a very long and storied

history as the training ground for top mathematicians in the world. At the same time, I was taking several courses with some French professors who had graduated from the ENS. I was impressed by their achievements in math and their kindness toward the students. So I applied for the International Selection in 2010 and was delighted to be admitted. The first year at the ENS was challenging, because I had a lot of courses that year, but they gave me much a rich understanding of different areas in mathematics. A big advantage of studying math at the ENS is the ability to draw on the resources of all the universities in Paris. We can select courses and choose our thesis advisors from other universities. Besides the high quality of the curriculum, what touched me most about the ENS was the trust and support from our teachers. We all have a tutor who helps us select courses and find thesis advisors. We also receive help in learning how to write papers and give lectures, working with young mathematicians as well as senior professors. I also learned a lot from my fellow talented schoolmates. Workshops provided a really quick way to learn something with other students who shared the same interest. Their enthusians and curiosity for all things mathematical kept me motivated throughout my

course of studies. The ENS has been like a big family for me, not only supporting me academically with my math studies but also helping me develop as a person. It is truly a wonderful experience to study math at the ENS and to live "la vie en rose" in this beautiful city!"

→ Nicolas Curien lecturing





MATH AT THE ENS

### PIETRO VERTECHI / FROM PISA (ITALY), ENS STUDENT

"After two years at the University in Pisa, I applied to the ENS as part of the International Selection competition in 2011, based on the enthusiastic accounts from friends from Pisa who had taken the same route. Once there, my expectations weren't



disappointed: on the one hand, there were the incredible academic offerings at other universities in Paris, probably the largest center of mathematical research in Europe, if not the world. On the other hand, there was the advantage of being at a school that encourages students to expand their horizons by attending courses in different subjects. Because the ENS is a relatively small university, I've had the opportunity to have direct contact with my professors, who willingly spend their time helping and advising their students. Despite some linguistic challenges at first, life in the student dormitory helped me get to know my fellow French and foreign students well, even if I had a different personal background. Indeed one of the most interesting aspects of my life at the ENS has been living and working with openminded students, who are always willing to share their points of view on different subjects. Beyond the ENS, I've enjoyed the rich theater scene and the huge number of museums and exhibitions Paris has to offer as one of the most culturally active cities in Europe. On the whole, I strongly recommend this opportunity to anybody who's looking for an enriching experience abroad as well as a first-class education.'

<sup>ee</sup> … THE SCHOOL'S HISTORIC ROLE HAS BEEN IN TRAINING THE FRENCH INTELLECTUAL ELITE… <sup>99</sup> SYLVIA SERFATY

STUDYING AT THE ENS

CAMPUS LIFE

MATH AT THE ENS



### Life after the ENS

↑ Discussion with François Loeser and Wendelin Werner, Fields Medal winner

In addition to offering a universal language for abstract ideas, mathematics forms the basis of nearly every science, from biology to economics, cryptography, oceanography, and sociology. Not surprisingly, ENS mathematics graduates have a variety of possible paths open to them, aided by the international prestige and distinction that comes from an ENS degree. While many ENS students remain in academia, continuing on to become professors and researchers at major universities and research institutions around the world, others choose to go into business or government or other technical fields.



↑ Laure Saint-Raymond, professor

ÉCOLE NORMALE SUPÉRIEURE

# CAMPUS LIFE

The career paths of ENS alumni from all fields, three to nine years after graduation. (Source: Lehmann report, 2008)

**Career Choices Made by ENS Students** 

**7** university professors

**6** corporate executives

for the Grandes Écoles

**Career Snapshot of All ENS Graduates** 

1 research engineer

in 1999, here's where they landed 10 years later:

Among the students enrolled in the first year of the math program

13 researchers with positions outside *France* 

**5** graduates of civil-service training schools

**4** teachers dedicated to preparing students

5 researchers with the CNRS or INRIA (French state-funded research centers)

- Higher education and research
- Secondary school teaching
- Public service other than teaching
- Private sector
- Pursuing further studies (or did not participate in the survey)



5 %

5 %

10 %

**Career Paths** 

### Student Feedback



### **DAVID BESSIS / COMPANY HEAD**

"I started at the ENS in 1991. It was easy for me to choose between the ENS and the École Polytechnique for a lot of superficial reasons (the campus was prettier, in a better location; the entrance examination had been more interesting) and for a more serious reason: of the two, the ENS truly integrated the sciences and the humanities. I had no definite plans. I enjoyed mathematics but I enjoyed literature just as much. As a student at the ENS, I didn't feel hemmed in. I liked the idea you could study everything and anything you wanted to. I admit I was rather intimidated by the classes during the first year, especially in algebra. Before that,

I had never left a math class feeling I was too dumb to understand. But I liked the difficulty: no other academic discipline gave me the same sense of dizziness and pure joy. After a first attempt that I quickly abandoned, I started my PhD in 1995 on a subject in algebra that I enjoyed and with an advisor it was a pleasure to work with. I worked on my PhD out of intellectual curiosity, without any career plans and without thinking that I had the capacity to be a researcher. In the 19<sup>th</sup> century, curious and leisured young men used to board ships and go around the world: doing a PhD felt like the modern equivalent for me. Math



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LIKE

STRANGELY.

I HAVE NEVER

FELT SO MUCH

A RESEARCHER

AS I DO NOW

AS THE HEAD

OF A COMPANY.

ENS students operate at a really high level, without an equivalent in the world, and being far from Paris helps you appreciate how high that level is. I was recruited by the CNRS when I returned and came back to the ENS as a researcher in 2003 and had a very productive period, proving a conjecture that had been made in the 1970s. Meanwhile, I published two literary works (I had started to write other things while working on my dissertation). In 2008, an experience with a private company helped me discover statistics, a

made me travel indeed: two vears

at Yale, one in Moscow, several

long stays in China and Japan. My

years at Yale were very enriching.

branch of math I had always disdained, but now I found its beauty astonishing. I became aware of the importance and the universal nature of the problems of data mining: how to make sense of huge volumes of data. With a friend, and following a very mathematical intuition, I created a start-up in 2010. Strangely, I have never felt so much like a researcher as I do now as a company head. The creative process involves getting stuck on a problem, feeling stupid, laboring, floundering, changing your point of view and finally realizing that the solution is obvious. I feel like this is exactly what I learned at the ENS."

**STUDENT** FEEDBACK

### **Student Feedback**

### ITAI BEN YAACOV / FROM HEBREW UNIVERSITY, JERUSALEM, 2001 ENS GRADUATE, **PROFESSOR AT THE UNIVERSITY OF LYON 1 SINCE 2006**

"I was admitted to the ENS in 1998. having obtained a bachelor's degree in mathematics and computer science from Hebrew University. I specialised in mathematical logic, got my M.Sc. and Ph.D. from Paris VII and went on to a post-doc and then a tenure-track position in the US. I then came back to France, and I have been a math professor at the University of Lyon 1 since 2006. When I compare my situation as a student in Paris with the experiences of my classmates from Jerusalem who went on to graduate school elsewhere, I see only advantages. First of all, studying at the ENS means having access to several universities in and around Paris, which offer a huge number of courses, seminars and advanced

99 THE TIME I SPENT AS A STUDENT IN PARIS WAS **A DEFINING** PERIOD IN MY LIFE BOTH PROFESSIONALLY AND PERSONALLY.



degrees in every imaginable area, an abundance that can be found in very few other places in the world. The ENS's residence system immediately immersed me socially (and linguistically) in a very heterogeneous group of French students in many areas of the sciences and the humanities. And of course, studying at the ENS means living in Paris, in a fairly central part of this fascinating city, with all the cultural, gastronomic and other advantages this provides. The time I spent as a student in Paris was a defining period in my life both professionally and personally. I would recommend students from around the world to grab the opportunity without hesitation."

### DINAH ROSENBERG / PROFESSOR OF ECONOMICS AT THE ÉCOLE DES HAUTES ÉTUDES COMMERCIALES (HEC)

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SUBJECTS

ARE DEALT

WITH IN GREAT

DEPTH WITH

TREMENDOUS

INTELLECTUAL

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RIGOR.

"I started the ENS in mathematics in 1991. I wanted to study there because at ENS, you can truly make your own choices while studying in depth what you like most. I didn't see myself as an engineer or civil servant; truthfully, I didn't know what I wanted to do after my studies, but I felt that the ENS was the best fit for me academically. I enjoyed my four years at the ENS tremendously. I loved the freedom we had over our studies, the confidence placed in us to determine our own path; while at the same time, the teachers were very accessible and able to help each of us find our way. I also loved the real campus atmosphere full of students with very different interests, but most



emerging intellectual quest in mind. I liked the diversity and culture I found at the ENS. This

intermingling of people of different backgrounds and interests led me to get involved with theater, which I became very passionate about. And it even led me to change my major. While working on my master's degree in economics, I discovered game theory and noticed "by chance" that the math department offered a seminar on game theory. In the end, I did my PhD on mathematical games. I think that kind of navigating across disciplines was possible, because the ENS offers such a variety of choices. After my PhD, I did a post-doc year abroad, and after that, I was hired at the University of Paris-13, where I spent eight years as an assistant

professor. For the last two years I have been a full professor at the École des Hautes Études Commerciales in Paris."



### STUDYING AT THE ENS

### Student Feedback

### BENOÎT COLLINS / PROFESSOR OF MATHEMATICS AT THE UNIVERSITY OF OTTAWA

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I WANTED TAKE

AN INTERDISCI-

AS MUCH OF

PLINARY

APPROACH

AS POSSIBLE.

"Since high school, I had been attracted to mathematics as well as physics. I remember telling this to some family friends who were physicists, and they warned me about the potential drawbacks of mathematical research, which could be too cut off from the rest of the world. This warning stuck with me and

influenced my studies and my career as I wanted to take as much of an interdisciplinary approach as possible. Even now, my research at the intersection between algebra and probabilities means that I work with probabilities specialists, statisticians, as well as specialists in representation theory, operator algebra, mathematical physics and even quantum computing. This great diversity of contacts is one of the favorite aspects of my life as a researcher. The ENS was the ideal place for me to acquire solid training in mathematics, while at the same time allowing me to expand my academic horizons. In my first year at the ENS, I enrolled in a Japanese language class out of curiosity, but

also because I hoped to learn by traveling during my student years. I did a six-month internship at the University of Tokyo, which helped improve my cultural and linguistic knowledge but also introduced me to a theory that became essential when I started my PhD. This opportunity to travel as a student let me stay in contact with many

> Japanese researchers, who later invited me back to Japan, first for a two-year post-doctoral program at the end of my PhD and then as a visiting professor in 2008-2009. Since 2007, I've been a professor at the University of Ottawa in Canada. From a mathematical point of view, it is a very interesting cultural laboratory in which French and American mathematical schools come together - along with a large number of Russian and Eastern European professors. I try to continue teaching and researching mathematics in the same spirit that was taught to me at the ENS, while also opening myself up to the world and to other cultures."

### VALERIA BANICA / FROM BUCHAREST UNIVERSITY, 2000 ENS GRADUATE, MAÎTRE DE CONFÉRENCES, UNIVERSITY OF ÉVRY VAL D'ESSONNE

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I ENJOYED THE

AND FRIENDLY

ATMOSPHERE.

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SCHOOL'S LIVELY

"I came to study math at the ENS 15 years ago and still wonder at my great fortune to have followed that path. The ENS school of mathematics is internationally recognized as one of the very best, and its location in Paris, with its extraordinary concentration of math specialists, makes it a very special place indeed. During my first year I enjoyed the school's lively and friendly atmosphere and the classes taught by top level researchers. I was lucky to be assigned to an excellent tutor, whose advice helped me choose an area for my master's,

which remains my area of expertise today. For my PhD, I spent a lot of time working in the ENS's math library, which has an exceptional collection of books and journals. But the most valuable aspect of the ENS was the other people I encountered, who were studying very different subjects: physics, biology,



a very lively on-campus pub. The various student clubs are also an attraction. I myself had an excellent experience as a member of the drawing club. Last but not the least, I think it is an extraordinary opportunity to experience your 20s in the heart of Paris's Latin Quarter."



### **Student Feedback**

#### LIE FU / 2011 ENS GRADUATE, TEACHING ASSISTANT

MORE FIELDS

WINNERS AND

NOBEL PRIZE

LAUREATES PER

SQUARE METER...

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MEDAL

"I heard about the ENS in China through an internet article my father shared with me, which talked about an interesting school in France that had produced more Fields Medal winners and Nobel Prize Laureates per square meter than any other institution in the world. I still didn't know

much more about the school, but I knew my two hero mathematicians, Galois and Cartan, had come from there. At the time, though, I was still focused on universities in the US like Harvard and Princeton. Things changed during my third year at Beijing University when two friends of mine were admitted to the ENS. That's when I learned about the international selection process for foreign students. I then started making a serious comparison of the ENS with the US universities. For me the key advantage of studying math at the ENS is that all of the universities and research institutes concerned with math in Paris work together. So being admitted to the math department at the ENS is like being admitted to all of the

math training programs all over Paris. I love the combination of laying a solid foundation in mathematics early on, followed by the ability to take math courses on any subject, anywhere in Paris, for full credit at the ENS. In short, the incredible diversity of mathematics resources in Paris is for me the most compelling

> reason for coming to the ENS. There seems to be no other city that could provide anything comparable. The large community of mathematicians from all specialties in Paris facilitates finding supervisors for a master's or a doctoral thesis. The sheer volume of seminars, workshops, conferences and summer schools on all sorts of math topics makes research easy to do and provides a concentration of expertise you can't find in any other city. Finally, I just love the city of Paris and the ability to travel to other places in Europe. I enjoy the architecture, natural beauty as well as the overall atmosphere of art, culture and peace."

### **ROMAIN TESSERA / CNRS RESEARCHER AT ENS-LYON**

"At first I was leaning toward physics, but I preferred the way math was taught at the ENS. So I decided to train as a mathematician, planning to return to physics later on, which is what I am getting ready to do right now! I completed a doctorate in math at the University of Cergy-Pontoise and a post doc at Vanderbilt University in the US, and now I am a CNRS researcher at ENS-Lyon. Interactions with others and discussions are at the heart of my work as a researcher. *I especially appreciate the possibility* 



DISCUSSIONS ARE AT THE HEART OF MY WORK AS A RESEARCHER.



PATHS

CAMPUS LIFE







### **GRÉGOIRE DEVIRMENDJIAN /** HEAD OF THE LYONS DIVISION OF THE NUCLEAR SAFETY AUTHORITY

"I chose the ENS for a number of reasons: the difficulty of the competitive entrance exam actually appealed to me as well as the high quality of the teaching, the location of the campus in the middle of Paris, and the near-total freedom to build one's own study program. I also liked the fact that I wasn't closing any doors for myself by entering the ENS. As a student in the math department, I especially appreciated the professors' confidence in me and the way I was able to customize my studies thanks to the guidance of my tutors. The closeness between students and teachers also leads to a certain flexibility: during my third year I left for an internship at Columbia University in New York, thanks to a phone call from one of my teachers to a colleague of his across the Atlantic! After my first three years of studying, I was torn between starting a doctorate in math and working in



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THE INTELLECTUAL DEVELOPMENT THAT GROWS OUT OF **RESEARCH-**BASED TRAINING **REMAINS A VERY** STRONG ASSET IN MY CURRENT PROFESSIONAL LIFE.

the private sector. I worked with the French energy company GDF (Gaz de France) Suez on urban heating issues in Paris. After my very academic background, it was a bit of a shock to work in an industrial setting. Then I spent a year in Qatar, with the French oil company Total, before returning to Paris. For the last two years I have headed the Lyons division of the French Nuclear Safety Authority, in charge of radiation protection related to nuclear activities at nuclear plants, nuclear fuel cycle sites, and medical centers. My job calls for management skills, because I am in charge of a team of 40 people, but also for technical skills, for which my scientific training is very useful! The intellectual development that grows out of research-based training remains a very strong asset in my current professional life."

### SYLVIA SERFATY / PROFESSOR AT THE PIERRE AND MARIE CURIE UNIVERSITY

"Choosing the ENS was easy for me since I knew since high school I wanted to do research in mathematics. So the ENS was the school of my dreams. I also liked the presence of students from all disciplines, especially from the humanities, and the academic freedom that seemed to reign there. Once I arrived at the ENS, I especially appreciated the quality

**Student Feedback** 

of the courses. the verv close and informal contact with active researchers and the personalized advice we could get from them. I think no other Grande École provides you with as much latitude in organizing your own life. I took advantage of this by taking classes in the physics department as well as in the math department, and by moving through my studies and beginning a university career rapidly. The presence of teaching assistants and a studies director who personally supervised us was also crucial in helping me make important choices. The fact that all the sub-fields of mathematics are well represented in an equitable way is also very valuable. Finally, mixing with students from other disciplines made it very easy to

ask questions about physics, to understand contemporary issues in biology, to discover the latest breakthroughs in cognitive science, and so on. The bottom line is that the ENS is a place of intellectual enrichment where there is a constant exchange of ideas. After I took my degree, I became a tutor for the ENS in Cachan; then I was hired by the CNRS when I

THE BOTTOM LINE IS THAT THE ENS IS A PLACE OF INTELLECTUAL ENRICHMENT WHERE THERE **IS A CONSTANT** EXCHANGE OF IDEAS.



at NYU in New York, returning to Paris in 2007 to be a professor of mathematics at Pierre and Marie Curie University. I still have close ties to the Courant Institute and I regularly return there. In general, I really enjoy my profession as a researcher and university teacher, the tremendous freedom that it gives me, the constant intellectual stimulation, the collegial aspects of the job, the mix of age groups and the very international side of the discipline. This last point allows me to travel frequently and work with colleagues from all over the world. It is rather

finished my PhD. In 2001 I became

a professor at the Courant Institute

like a big international family! In short, I would not trade my job for

CAREER PATHS

CAMPUS LIFE

MATH AT THE ENS

ÉCOLE NORMALE SUPÉRIEURE

anything in the world."

## How to Apply

Each year the ENS organizes an International Selection allowing about 30 of the most promising international students to enter the ENS. They receive a monthly stipend of approximately 1,000 euros and room and board on the ENS campus at a modest cost (approximately 300 euros per month).

### Application

In order to apply, you must:

- provide proof of non-French nationality,
- be under the age of 26 at the date of enrollment,
- apply only once for this program,
- attend a university outside of *France*.

Students can submit an application online in **January** or **February** and must provide a transcript of their grades and a letter of recommendation from their math teacher.

In May students are notified whether they will be invited to *Paris* for a written and oral examination, which takes place in early July. The selected students will take the written tests and be interviewed by an examination panel immediately afterwards. Results are published within a few days. Candidates should plan to spend two weeks in *Paris*.

Classes start mid-September.

### For more information: www.math.ens.fr/international



↑ Some members of DMA

### DÉPARTEMENT DE MATHÉMATIQUES ET APPLICATIONS (DMA), ÉCOLE NORMALE SUPÉRIEURE

45 rue d'Ulm, 75005 Paris - France. www.math.ens.fr

We would like to thank the students and alumni who shared their experiences.

CREDITS: English version: Patricia Hudson Original French version: Éléonore de la Grandière Student Testimonials: © students Photo credits: © Steve Murez, 2010 & 2011 - © Olivier Boulanger (page 29) Graphic designer: © Mathilde Bardel, 2011 & 2013 - www.tilde-sign.fr

