



Why study mathematics?



Mathematicians are among the most sought-after professionals in Luxembourg. But what kind of jobs do mathematicians really do? Some graduates find a job in financial institutions or research facilities, where they apply the mathematical theories acquired during their studies.

If you have knowledge of probability and statistics, you can work as a risk analyst for banks and insurance companies. If you have knowledge of programming, you might find yourself working on data compression, numerical modelling and simulation, optimization, image reconstruction or cryptography, where theoretical numerical skills are an advantage.

However, it is not necessarily the case that mathematicians work on complex mathematical problems. Young graduates are valued for their logical thinking, approach to problem solving and solid understanding of numbers and abstract concepts.

Even in industrial environments like aeronautics or rail transport, mathematicians are often trusted to carry out complex tasks: evaluate the feasibility of a project, its physical variables like resistibility, size and ergonomics.

There is a huge variety of fields where mathematicians are in demand and the tasks of mathematicians working in the industry or finance might differ a lot from the rather theoretically oriented studies.

On the following pages we ask several graduates in mathematics of the University of Luxembourg to tell us more about their current jobs.

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What is your job about?

I work as an actuary at one of the leading Luxembourgish non-life insurance companies. My responsibilities include topics like pricing and reserving, but also profitability analysis, statistical and regulatory reporting, risk analysis and management (for instance by means of reinsurance), and multiple other topics relating to the technical piloting of the company.

What interests you most?

For me personally the most interesting part of my job is the diversity of the challenges I face daily. This gives me the possibility to continuously learn new things. The variety of subjects I work on ranges from technical tasks, where I can put in use my theoretical knowledge and implement mathematical models, to more interdisciplinary tasks, which require the logical mindset of a mathematician. The balance between application of mathematical knowledge, analytical skills, problem solving, creating and improving solutions, as well as learning new things from various domains is what keeps me interested and motivated in my job.

How did your studies prepare you?

Most importantly, my mathematical studies allowed me to develop my analytical mindset, critical and logical thinking, the capacity of abstraction, as well as problem solving skills. These are assets I can rely on every day.

Please describe your career path. What previous jobs have you had?

Like plenty of other mathematics students, I went into this field because of my interest and love for mathematics, the logical and analytical thinking that is so often associated with it, and my passion for problem solving. During my studies, I was still thinking about different career choices. After my bachelor and master studies in general mathematics at the University of Luxembourg, I had a brief excursion into teaching. As much as I value the experience, I soon realized that I missed “doing maths”. Taking a leap of faith, I reoriented my career path towards actuarial sciences, which I see as an application of mathematical tools and skills in a specific domain. I had the chance to start this new career path at LALUX. After some time of gaining practical experience, I got the opportunity to become the leader of my team.

How do you see career perspectives for mathematicians?

Mathematics and science are needed in our society. Job opportunities for mathematicians exist in a lot of different domains. You might have to look more broadly at job descriptions, because a lot of positions are looking for the way of abstract thinking and approaching problems logically, rather than a direct application of theoretical knowledge.

“Stay curious!

Embrace the challenge of facing new problems and discovering new things.”

**Patrick
HILGER**



**Actuary
LALUX
ASSURANCES**

What is your job about?

I am an investment risk manager at a management company. As such I am responsible for managing financial risk - such as market risk, credit risk, liquidity risk - for investment funds. My responsibilities include setting risk profiles for investment funds, production of different quantitative risk measures, discussing results with portfolio managers and reporting to senior management. In addition, I have the chance to work on many projects focused on defining and improving the risk management framework and systems of the company.

**Monika
ZLOPASA**

What interests you most?

For me, the most interesting part about my job is the combination of quantitative tasks, such as analysis of risk measures, and tasks requiring social skills, such as discussions or presentations to different stakeholders. In addition, I have the opportunity to work with many different types of investment funds, in a very dynamic environment, hence my tasks are very different from day to day and definitely never boring.

How did your studies prepare you?

The mathematical studies have helped me develop my analytical skills, problem solving ability, made me more detail-oriented and helped me understand any complex financial product or concept presented to me.

Please describe your career path. What previous jobs have you had?

I have been in my current position for a year now. Prior to UBS, I spent three years working for a consulting firm, Deloitte. Besides that, I did a summer internship of three months at a satellite company in Luxembourg, SES.

How do you see career perspectives for mathematicians?

I believe mathematicians are doing extremely well on the job market and have the ability to choose between many interesting industries. With regards to the financial industry, the job market in Luxembourg has been very active with many companies looking for new profiles in the last year or two. I also benefited from this when I changed jobs in October 2021. Based on my recent experience, I can confirm that having a mathematical background helps in differentiating yourself on the market and increases your chances to score an interview with your desired company.

Do you have any advice for young mathematicians?

If you wish to work in the financial industry, I would advise mathematicians to work on their soft skills: presentation skills; ability to explain complex concepts in a simple and understandable way; social skills to be able to maintain successful professional relationships and lead meetings and calls; team working and solving of disputes; etc. Often these soft skill areas can be forgotten in a mathematical education.

“Having a mathematical background helps in differentiating yourself on the market and increases your chances to score an interview with your desired company”

**Risk
Manager
UBS FUND
MANAGEMENT
LUXEMBOURG**

Master in Financial Mathematics (2019)



What is your job about?

I am polyvalent in my job and have different tasks and responsibilities depending on the project. Mainly, I am the link between IT of POST and their customers, mainly POST Courier.

When a new demand for a project enters IT, I perform an analysis to find out how IT could solve the need of the customer. This requires knowledge of both sides, i.e., of the customer and our IT. The goal is to propose the best solution for both sides.

For some projects, I do not only the analysis but afterwards take on the role of Project Leader and am the main person responsible to ensure the development of the product during the whole process and development.

**Ralf
GREIS**

What interests you most?

That I discover new challenges for each new project and that I can improve my knowledge of the customer and of IT at the same time. My job is mainly to find the best solutions for customer needs, which is not always simple as there are often many constraints (costs, manpower, deadlines, IT infrastructure, legal). I love this problem-solving!

How did your studies prepare you?

At first glance, my job has nothing to do with mathematics anymore. But nevertheless, my mathematical studies prepared me perfectly for this job because it taught me two important things: logical thinking and problem solving. With these two assets, one is able to dive into many different jobs, one only has to be ready to learn the other new aspects of the job, which as a mathematician goes very fast if one is interested!

Please describe your career path. What previous jobs have you had?

This is my first job, but at the beginning, I did not do Project Management, but Enterprise Architecture.

How do you see career perspectives for mathematicians?

In my eyes, it is easy to get a job that is related to mathematics in Luxembourg which is also well paid and secure (Teacher, Finance, Insurance, ...).

Getting a job like mine, which has nothing to do with mathematics, is more complicated as many HR do not see how a mathematician could do tasks like Project Analyst or Enterprise Architect. There one needs a bit of luck, which is sad...

Do you have any advice for young mathematicians?

Believe in your strengths and be aware of them! Don't hide them and don't be shy!

"At first view, my job has nothing to do with mathematics anymore. But my studies prepared me perfectly by teaching me two important things: logical thinking and problem solving."



**Business
Analyst in IT
POST**

What is your job about?

I finished my traineeship in 2021 at the secondary school where I was a student myself (Lycée Michel-Rodange Luxembourg). I was accompanied by qualified teachers who shared their practical experience with me. I'm very grateful for those 3 years of reflective teaching. I am currently teaching at Lycée Michel Lucius in Luxembourg City.

Florence
ZEYEN

What interests you most?

Even though it is sometimes challenging, the contact and interaction with the students is amazing and very fulfilling.

How did your studies prepare you?

My mathematical studies helped me to provide my students with materials that are mathematically correct.

Please describe your career path. What previous jobs have you had?

I have never had another job nor would I have wanted to work as anything else but a teacher.

I went straight from high school to university and back to school as a teacher.

How do you see career perspectives for mathematicians?

It is very easy to find a job as a mathematician. I was once told by a medical doctor that "mathematicians are those who sent one job application or none", and I think that this is absolutely accurate.

Do you have any advice for young mathematicians?

Never give up.

It's very hard to graduate in mathematics and I thought that it would be unachievable for me. Those that came before you made it too, so you should give it your best and believe that you can achieve your goal as well. The final result is worth the hard work.

"Mathematicians are those who sent one job application or none."

Mathematics
Teacher

Master in Mathematics Education (2018)



What is your job about?

We develop, install and manage onboard computing solutions for our company's truck fleet.

What interests you most?

It is located at the crossroads between electronics, mathematics, computer science and physics.

How did your studies prepare you?

For this job I need analytical skills, programming, modeling and a bit of physics.

Please describe your career path. What previous jobs have you had?

I was previously a PhD student.

Do you have any advice for young mathematicians?

Love maths for what it is: the foundation of everything. But be aware of employability, which can be tricky, especially in industry, research or finance/data where the competition is tough and global.

"Love maths for what it is: the foundation of everything."

**David
GASPERINI**



**IoT Engineer
EB Trans**

How did your studies prepare you?

My studies did not prepare me for any particular job. Instead, it helped me develop abstract and logical thinking. Any job, especially a first one, will require training and learning new things. I believe the skills learned during my mathematical studies allowed me to learn new things very fast and helped accelerate my carrier.

Jasper
VAN HIRTUM

Please describe your career path. What previous jobs have you had?

After my PhD, I worked for a scale-up that develops a web-based solution for travel and expense management. I started as an analyst-developer and quickly advanced to lead a team of four developers.

How do you see career perspectives for mathematicians?

The hard skills required for scientific jobs are evolving very fast. By the time you finish a specialized education, the field might have already evolved to the next big thing.

However, any future technical or scientific carrier requires abstract thinking and logical reasoning. A mathematics degree shows a future employer that you have that skill and that you will be able to apply it in any context.

Do you have any advice for young mathematicians?

Studying pure mathematics does not fix you into one single carrier, this makes mathematics an ideal path toward those jobs that do not exist yet.

“Any job, especially a first one, will require training and learning new things. I believe the skills learned during my mathematical studies allowed me to learn new things very fast and helped accelerate my carrier.”



PhD candidate (2017)

Innovation
Consultant
LEYTON

What is your job about?

I am managing relationships with important suppliers in the telecommunications industry on behalf of Vodafone. Based out of our Luxembourg supply chain headquarters, I supervise projects for the expansion and modernization of mobile networks, including the enhancement of the LTE network and the introduction of 5G technology. The mathematical background comes in very handy when dealing with large data sets, which then have to be deciphered to produce reports on performance of the business and the effects of each project on key performance indicators set by the company.

What interests you most?

With such a global presence, I get to work and interact in a very diverse environment with people from across the globe and opportunity to travel and participate in projects that shape the future of the telecommunication industry. I specifically like the constant self-development piece as the industry is always evolving and one needs to constantly update the knowledge bank to keep up with the pace.

Do you have any advice for mathematicians?

Recruiters look up to mathematics students to be future leaders so never let yourself be intimidated by any job description. Even if you don't have the skill set initially required for the job, you will pick up pace when you are in the field.

“Recruiters look up to mathematics students to be future leaders so never let yourself be intimidated by any job description.”

**Muhammad
Usman
BAJWA**

Master in Financial Mathematics (2014)

**Category
Manager
VODAFONE**



What is your job about?

I do valuation of financial derivatives (over the counter products).

Theodoros
NIKOLAIDIS

What interests you most?

90% of my workload is revolving around valuations. I am exposed to a plethora of different products (structured products, options etc.) which each need a different approach to be analysed/valued.



How did your studies prepare you?

The Master in Financial Mathematics at the University of Luxembourg includes financial courses such as introduction to stochastic processes, option valuation (under the Black-Scholes framework) and a sufficient amount of theoretical background. Indeed, the challenges faced in the financial industry are a bit simpler than what is being taught in academia. Nevertheless, it is highly beneficial to acquire a solid academic background, which is possible with the Master in Mathematics.

Please describe your career path. What previous jobs have you had?

My previous jobs relate to

1. teaching (private tutor of high school mathematics/physics)
2. analyst of life insurance policies (internship).

How do you see career perspectives for mathematicians?

Frankly speaking, there is an abundance of jobs/careers a mathematician can follow. From computer science related data analysis to software development, market analysis, consulting and teaching. What is really appreciated in the job market is the precision, consistency and methodology in problem solving. Studies in mathematics offer students skills (i.e. in problem solving) which make them reliable future employees. Compensation, job stability etc. is indeed at above-average levels but still that's a bit subjective.

Do you have any advice for young mathematicians?

Studying mathematics seems like climbing a mountain; often times you don't even see the peak and indeed it is a difficult ride. But even with failures and no matter how difficult it might seem at the beginning, with effort and by making (a lot of) mistakes one eventually learns the objective and achieves their goal. Furthermore, studying mathematics is truly brain-training; all the knowledge and skills a student acquires through their studies will follow them throughout their life. The core of education in mathematics can be understood as a language, and as such is a truly powerful skill to unlock. The core of education is mathematics to be understood as a language, and as such is a truly powerful skill to unlock.

"What is really appreciated in the job market is the precision, consistency and methodology [of a mathematician] in problem solving."

Senior
Consultant
E&Y

What is your job about?

As Manager in the Performance Management (Corporate Finance) team, my key mission has been to review, analyse and comment on the performance of business units and segments of the company based on Key Performance Indicators (KPIs), preparing group presentations to support business leadership in decision making. This was achieved in close collaboration with other transversal departments in corporate finance (Tax, Treasury, Strategy, HR, Investor relations and M&A). I've been responsible for the database used by the team for reporting, strongly contributing to the improvement and optimization of the systems and processes in place. In addition, I've coordinated the implementation of RPA (Robotic process automation) to automate repetitive tasks.

Please describe your career path. What previous jobs have you had?

Initially, I applied for a 6-month internship in ArcelorMittal during the last year of my Master program. Before the end of the internship, I was proposed to join permanently the Performance team (Corporate Finance) as a junior analyst. Since then, my career has been evolving: I've assumed different responsibilities within the team and I was promoted to Supervisor, becoming Manager three years ago.

"Initially I applied for an internship in ArcelorMittal. I was then proposed to join permanently and since then my career has been evolving to supervisor and manager."

Master in Financial Mathematics (2012)

**Cristina
BARBOLAN**

**Manager,
Head of
Controlling
ARCELOR
MITTAL**

What is your job about?

I work as a data scientist at Amazon in Amazon Fulfillment Technologies (AFT) department that builds cyber-physical fulfillment systems on a global scale using the latest developments in robotics, machine vision, machine learning and industrial IoT. AFT powers physical fulfillment for goods our customers buy on Amazon worldwide.

I work in a team of research, applied and data scientists who work on different projects within AFT. My day consists of working on projects involving deep dives into different business problems; extracting, cleaning, analyzing and modeling the data to identify patterns and trends to solve business problems and building dashboards.

Around 20% of the day is spent talking to my business stakeholders about the projects I am working on and meeting my colleagues in team meetings, stand ups and reading groups. The main tools I use are Python, SQL, Tableau and AWS technologies.

What interests you most?

Sometimes it is not easy but it is energizing to learn constantly as none of the projects are the same and they require different approaches to solve them. I like learning about new technologies and learning about different business models within Amazon.

Even though Amazon is one of the largest companies in the world, working there often feels like working in a start-up.

At Amazon you will meet many bright people from whom you can learn a lot as most are willing to share their knowledge and give you advice about career and work you are doing. I also very much enjoy flexibility of work and working remotely.

Please describe your career path. What previous jobs have you had?

While finishing my masters at the University of Luxembourg, I started working at Amazon as an intern in the supply chain team. After finishing the internship, I joined Amazon full time where I worked in various departments as a business intelligence engineer/data scientist.

How do you see career perspectives for mathematicians?

Studying mathematics opens a lot of doors after graduating - mathematicians are sought after in almost any industry, and you have lots of flexibility to switch industries. You'll learn the business domain, but the core stays the same as every industry has the data, and if you know how to apply data science you will learn the industry. I would suggest learning tech skills such as programming, cloud technologies and developing good communication skills. Expanding your portfolio of functional skills is part of a career in data science.

Do you have any advice for young mathematicians?

Don't be afraid to try out new things and take risks - your background in mathematics will give you good skills to be successful at work and will provide a good safety net.

"Studying mathematics opens a lot of doors after graduating."

Lucija
CALIC

Data
Scientist
AMAZON

Master in Industrial Mathematics (2017)

What is your job about?

I am a data scientist at the Registration Duties, Estates and VAT Authority. My job is to analyse data in order to detect past trends, current tendencies and possible future developments. In order to do this, I mostly use tools such as SQL, NoSQL, Python and others. The data analyses I perform range from basic exploratory data analyses to machine learning algorithms. Besides, my tasks also include the cleaning of data and in some cases, the completion of existing data with complementary data gleaned from the internet via web scraping.

**Jill
ECKER**

What interests you most?

What interests me most in my job is the continuous and rapid learning of an immense variety of diverse subjects. During my apprenticeship, I followed an intense formation about numerous fiscal laws and other topics. I also had the opportunity to learn new informatics techniques and to hone my programming skills. Moreover, in order to be able to perform sensible data analyses, I need to understand the meaning of the data, which necessitates the understanding of different economic sectors and the corresponding fiscal laws. I appreciate having the opportunity to work in such diverse fields as law and informatics simultaneously.

How did your studies prepare you?

My studies in mathematics included programming and I also followed some courses on machine learning. Besides, having notions about statistics and model building helps generating useful data analyses. On the side of soft skills, studying mathematics allowed me to develop perseverance, resilience and a resistance against frustration. These qualities allow me to attack complex problems and to keep gnawing at them until they are solved. Finding mathematical proofs also developed my sense for creation, innovation and the ability to work independently. These qualities are advantageous in any job.

How do you see career perspectives for mathematicians?

Personally, I had no trouble finding a job. There were several job descriptions which I deemed fitting for a mathematician, and to which I applied, ranging from data analyst to actuary. The analytical, logical and precise methods used by mathematicians to solve highly complex problems can be applied in numerous domains.

Do you have any advice for young mathematicians?

I would recommend young mathematicians to learn and practice programming until reaching a good level. Data analysis is nowadays really important. While it is already good if you can develop models to analyse data, it is even better if you can also implement these models by yourself. In addition, potential job applicants should not let themselves be intimidated by the job description.

"If a job description interests you, then you should apply, even if you think that the description might not fit."



**Data
Scientist
LUXEMBOURG
GOVERNMENT**

**Denise
WAGNER**

What is your job about?

I am working in the field of VAT (Value Added Tax). My job mainly consists of participating in the preliminary work regarding legislative proposals of the European Commission and in analysing, in a preparatory body of the Council of the European Union, the legislative proposals submitted by the European Commission. Furthermore, I participate in OECD meetings on the subject of consumption taxes in general and follow the judgements of the Court of Justice of the European Union related to VAT.



Master in Financial Mathematics (2013)

What interests you most?

What interests me most about my job is the diversity of subjects that I can devote myself to and that I get to learn about. My job is not only about knowing how the VAT system works, but in order to be able to analyse and evaluate a legislative proposal from the European Commission I also have to understand the functioning of specific economic sectors. For example, the European Commission intends to submit a proposal to amend the current VAT scheme for travel agents, a proposal to tax financial services and a proposal dealing with taxation in the context of the sharing economy. Therefore, I need to know how the travel industry/sharing economy/financial sector functions and which business models exist, in order to understand the problems arising from the current VAT treatment of those sectors and to be able to assess the proposed changes. To make it short: it never gets boring!

**Jurist
LUXEMBOURG
GOVERNMENT**

How did your studies prepare you?

Obviously, there is no direct link between the content of my studies and my current job. However, there are a number of qualities developed, respectively perfected, during my studies that are crucial to it. First of all, the ability to deal with highly complex subjects and problems and the joy I experience in doing so. The perseverance and high frustration tolerance necessary to succeed in studying mathematics are very helpful too as is mathematical thinking in general. Finally, my scientific background constitutes an advantage in case the use of advanced technologies such as blockchain in the VAT area, whose potential is currently discussed, will be further investigated and/or introduced.

How do you see career perspectives for mathematicians?

When it comes to job stability and salary, I am not in a position to give an objective answer because I work in the public sector since the beginning and the same holds true for nearly all former math students I know. Concerning the ease of finding a job, my personal experience was not very positive back in 2013. Since my Master was in Financial Mathematics, I mainly applied to banks, insurance companies and consulting companies at the beginning, most of which unfortunately preferred economists, actuaries and computer scientists.

"I would recommend to try to figure out what you want to do as soon as possible and not wait till after graduation."





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