# Welcome to IM²AG

## GUIDE INTERNATIONAL RELATIONS

UFR IM²AG

UNIVERSITÉ Grenoble Alpes

# About the UGA

The Université Grenoble Alpes (UGA) is one of the leading universities in the fields of higher education and research in France.
The UGA aims to take on the challenges facing today's universities and the universities of the future in the increasingly competitive world in which we live, as well as to increase international visibility and to become more attractive at the international level.

The Université Grenoble Alpes is already ranked in the top 100 and 200 in several fields of science in major international rankings (Reuters, Shanghai, Times Higher Education, QS...), and its dynamic research and innovative teaching methods rival those of the world's leading universities.

# Welcome to the Université Grenoble Alpes (UGA) !

The university and its students, faculty, and staff are deeply tied to the world around us. We believe these local and global ties make our research, our teaching, and our communities rich and strong, and you will see them reflected in all of our key activities.
International relations have pride of place in our global university, which is open to the world and part of a diverse and growing network of partnerships.

The UGA's traditions – of innovation, of diversity, of excellence – are embodied in our expertise in education, creating a welcoming environment for international students, faculty, and staff and fostering the necessary skills in those who wish to broaden their horizons with an international experience.

Innovation and excellence also enrich and sustain our world-class research, making the most of an exceptional scientific environment with strong ties to business and industry. Our community of researchers includes experts from all over the world, who work across disciplines in the service of knowledge and in the spirit of inquiry.

# A word from our President, Lise Dumasy

"The Université Grenoble Alpes is the result of the merger of three universities on January 1, 2016: Université Joseph Fourier, Université Pierre Mendès-France and Université Stendhal, making it the fifth university in France in terms of students.

The Université Grenoble Alpes is made up of 24 faculties, institutes and schools, 80 laboratories, 5,500 staff members and 45,000 students. In pooling its resources and combining its strengths, the UGA has now set in motion the creation of a major competitive university. The research, which is divided into six interdisciplinary centres, is organised to be at the cutting edge of innovation and the degrees offered, separated into four divisions, cover all of the academic disciplines.

Increasing interdependence with countries and different segments of society is a significant challenge for universities today. They have to take their place at the heart of this dynamic. In strengthening the bonds between education and research on the one hand, and encouraging interaction between education and research and the socio-economical and cultural community on the other, the Université Grenoble Alpes promotes openness, interdisciplinarity and innovation – all key ingredients for offering high-quality education and leading scientific research.

As the Université Grenoble Alpes already has strong ties to the region, it also aims to become ever more attractive on an international level and to increase its international influence. The university will be a key player in the region's social, economic and cultural development on a national and an international level, in keeping with the area project led by the partners of the Communauté Grenoble Alpes.

The UGA aims to take on the challenges facing today's universities and the universities of the future in the increasingly competitive world in which we live. The university is dedicated to meeting these common and exciting challenges with ingenuity, creativity and a willingness to build the future."

*Lise Dumasy*
*President of the Université Grenoble Alpes*

# A word from the chair

**T**he Teaching and Research Department in Computer Science, Mathematics and Applied Mathematics of Grenoble (UFR IM²AG) hosts about 650 undergraduate and graduate students every year with the support of 30 administrative staff members and taught by 180 faculty members who, by their educational and scientific excellence, contribute to the reputation of Grenoble.

The UFR IM²AG offers a wide range of courses in pure mathematics, applied mathematics and computer science.
The main careers following studies at IM²AG are :
- Teaching in secondary and higher education
- Developers / Software Engineers in simulation, video games, and robotics,
- Experts in cyber-security,
- Project Managers in IT or industrial mathematics,
- Actuarial, banking, insurance analysts,
- Data analysts and data managers,
- Research and development in companies.

The UFR IM²AG welcomes foreign exchange students and offers several international courses. The UFR IM²AG is at the very core of the industrial eco-system. It has developed strong partnerships with more than 200 companies that employ a large number of students who have graduated from the UFR.

Courses at the UFR IM²AG readily use recent scientific research carried out within the MSTIC pole (Mathematics, Sciences and Technologies of Information and Communication). Grenoble is one of the few sites where excellent research laboratories (with the CNRS or INRIA partnerships) and industries in the fields of micro and nanotechnology, ICT and mathematics collaborate. It is also a pioneer site in France for research on the interface between mathematics and computer science. Recruiting visiting instructors from these industries is particularly valuable for our future engineers' education and entry into the workplace. It has also contributed to the creation of several courses which include work experience.

Public research in Mathematics and Computer Science on the Grenoble site is at the highest international level (1 Turing Award, four members of the Académie des Sciences, 9 members of the Institut Universitaire de France).

It is carried out in the following research laboratories:
L'Institut Fourier ;  Le Laboratoire d'Informatique de Grenoble (LIG) ; Le Laboratoire Jean Kuntzmann (LJK) ;  Le Laboratoire G-SCOP (Sciences pour la Conception, l'Optimisation et la Production de Grenoble) ;  Le Laboratoire GIPSA (Grenoble Images Parole Signal Automatique) ;  Le Laboratoire TIMA (Techniques de l'informatique et de la microélectronique pour l'architecture des systèmes intégrés) ;  Le Laboratoire TIMC (Techniques de l'Ingénierie Médicale et de la Complexité) ; Le Laboratoire VERIMAG

Don't hesitate to come and join us!

Christine Verdier
Director of UFR IM²AG

# Come to UGA

**T**he UGA is located in Grenoble, an international city and a wonderful place to live, work, and study. Nestled in the Alps, Grenoble enjoys an incomparable natural setting, with opportunities for sports lovers and nature enthusiasts alike. Grenoble also participates in France's good life, offering a wide variety of cultural events, a lively nightlife, and hundreds of restaurants for those wishing to sample France's world-famous cuisine. French and international students are engaged and aware: students will have no trouble finding organizations and activities that matter to them. A public university, the UGA embraces France's values for higher education.

# Summary

# Key figures

With more than 160 partnerships and joint degrees, the department of Computing, Mathematics and Applied mathematics (IM$^2$AG)
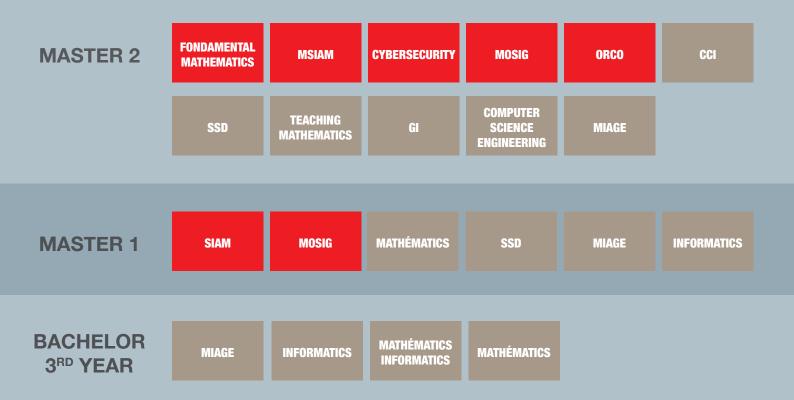
- Supports students applying for a mobility through the establishment of international education programs during the year or of semesters abroad, of joint degrees or of work placements abroad;

- Welcomes international students to our French speaking and international training courses.

- Helps students applying for an international mobility to find funding with the support of the International Students and Scholars Office (ISSO) of the University.

- Along with the ISSO and various student associations, assists incoming students during the administrative and social assistance process.

Contact: ri.im2ag@ujf-grenoble.fr

# Training program of UFR IM²AG

**DOCTORAT**

| MASTER 2 | | | | | | |
|---|---|---|---|---|---|---|
| FONDAMENTAL MATHEMATICS | MSIAM | CYBERSECURITY | MOSIG | ORCO | CCI | |
| SSD | TEACHING MATHEMATICS | GI | COMPUTER SCIENCE ENGINEERING | MIAGE | | |

| MASTER 1 | | | | | |
|---|---|---|---|---|---|
| SIAM | MOSIG | MATHÉMATICS | SSD | MIAGE | INFORMATICS |

| BACHELOR 3RD YEAR | | | |
|---|---|---|---|
| MIAGE | INFORMATICS | MATHÉMATICS INFORMATICS | MATHÉMATICS |

**MSIAM :** Master of Science in Industrial and Applied Mathematics
**SSD :** Master's Degree in Pure and Applied Mathematics
      specialised in Statistics and Data Science
**ORCO :** Operations Research, Combinatorics and Optimization
**MOSIG :** Master of Science in Informatics at Grenoble
**CCI :** Supplementary Computer Skills
**MIAGE :** Méthodes Informatiques Appliquées à la Gestion des Entreprises

■ **Training in french**
■ **Training in english**

# International training program of UFR IM²AG

## FUNDAMENTAL MATHEMATICS

### Program description and objectives

The M2 program changes every year in order to cover a variety of topics and according to the current research projects of the Institut Fourier. The 2017-2018 M2 program of pure mathematics will cover Probability and mathematical Physics. It will consist of three basic courses in the Fall semester (each student selects two with the program coordinator's approval), and of three advanced courses in the Winter semester (each student selects one).
The Winter and Spring terms are mainly dedicated to the students' research placement and to writing their Masters' thesis.

## OPERATIONS RESEARCH, COMBINATORICS AND OPTIMIZATION (ORCO)

### Program description and orbjectives

The first semester of this second year of the master is dedicated to the specialisation part of the program, and the second semester is dedicated to a 5-to-7-month internship in a company or in a laboratory, for 27 ECTS.
Academic objectives:
Training students in the foundations and methods of operational research (computer programming, graph theory, complexity, stochastic programming, heuristics, approximation algorithms, etc.) and
Preparing students to use and develop these methods for complex industrial applications (supply chains, scheduling, transport, revenue management, etc.) and to implement appropriate software solutions

### Professional objectives:

At the end of the program, the students should be able to pursue a career in research (academic or industrial PhD), or to join major research and development departments or consulting companies in optimization. They might also build upon their ability to analyze operational problems methodologically to join less specialized companies and act as key actors in performance management: either by interfacing with consulting firms or by developing in-house solutions.
In the long run, students who are moving towards industrial careers, strengthened by their experience in improving business performances and by the development of business-specific knowledge, should naturally reach decision-making positions with a high level of responsibility.

# CYBERSECURITY

## Program description and objectives

The economic impact of cyber criminality amounts to losses of hundreds of billions of euros per year worldwide (445 billion dollars, according to a McAfee/CSIS study in 2014) and the frequency of these attacks keeps on rising, particularly in the areas of identity and digital data theft and malicious attacks. Protection against these vulnerabilities includes:

- Robustness to cyberattacks of sensitive infrastructure (e.g., stuxnet)
- Robustness of security components to software vulnerabilities and data leakage (e.g., heartbleed),
- The protection of privacy and the security of cloud infrastructures
- The robust design and evaluation of security components ,
- The detection of vulnerabilities in protocols or in software and material components.

The various topics addressed in the program include subjects that are complementary to cybersecurity, such as cryptology, forensic and privacy protection for embedded systems and distributed architectures.

Training cybersecurity experts in (including in aspects relating to"data privacy" ) up to the Master level, with the possibility of immediate access to employment in the industrial sector, or an eventual thesis.

# MASTER OF SCIENCE IN INFORMATICS AT GRENOBLE (MOSIG)

## Program description and objectives

The objective of this program is to provide high-level training in Computer Science for careers in education, research, engineering and development. The program covers a wide variety of subjects during the first year, providing students with general education and a solid foundation in informatics (in programming languages, databases, networks, software engineering, object oriented designing/programming, complexity and interactive software). In the second year, students acquire the organisational skills necessary for a career in research and as specialists in an area related to informatics, in conjunction with a number of available options (Advanced Information Systems & Software Engineering (AISSE), Artificial Intelligence and the Web (AIW), Graphics, Vision, Robotics (GVR), Ubiquitous and Interactive Systems (UIS) and Parallel, Distributed & Embedded Systems (PDES)). In short, the objective is to provide students with the necessary foundation for a career in research and development as well as for a thesis in informatics in the areas covered by academic and industrial laboratories.

The research community linked to this program is internationally recognized and high profile.

# MASTER OF SCIENCE IN INDUSTRIAL AND APPLIED MATHEMATICS (MSIAM)

## Program description and objectives

Currently, applied mathematics is an area that provides many job opportunities, in industry and in the academic world. There is a great demand for mathematical engineers on topics such as scientific computation, big data analysis, imaging and computer graphics, with applications in many fields such as physics, medicine, biology, engineering, finance, environmental sciences.

The Master of Science in Industrial and Applied Mathematics (MSIAM) offers a large spectrum of courses, covering areas where the research in applied math in Grenoble is at the best level. Our graduates are trained to become experts and leaders in scientific and technological projects where mathematical modeling and computing issues are central, in industry or research. A large and distinguished graduate Faculty participate in the program, bringing their expertise in a wide range of areas of mathematics including applied analysis, numerical analysis and scientific computing, probability theory and statistics, computational graphics, image analysis and processing, and applied geometry.

The academic program is a two-year Master program (120 ECTS), fully taught in English. It combines three semesters of courses and laboratory work (90 ECTS) with a six-month individual research project (30 ECTS).

The first year is composed of a common core which provides theoretical and practical grounds in probability and statistics, PDE and modelling, images and geometry as well as computer sciences, optimisation and cryptology.

In the second year, the third semester is essentially divided in 4 tracks :
- Modeling and Scientific Computing (MSC)
- Geometry, Image and CAD (GICAD)
- Statistics (STAT)
- Data Science (DS)

# The other proposed training

## SSD: Master Mathématiques et applications Parcours Statistiques et Sciences de Données (Master's Degree in Pure and Applied Mathematics specialised in Statistics and Data Science)

This course is offered to both the Pure and Applied Mathematics (Mathématiques et Application) section of the IM²AG and to the Computer Mathematics Applied to Social Sciences (Mathématique Informatique Appliquée aux Sciences Humaines et Sociales) section of the SHS department

## Teaching Mathematics

The teaching professions represent a large section of the future professional prospects of Mathematics students. This course offers full training for everything involved in the open contest for "Agrégation" in Mathematics (written and oral tests).

## CCI: Compétences Complémentaires en Informatique (Supplementary Computer Skills) - Second year

The teaching professions represent a large section of the future professional prospects of Mathematics students. This course offers full training for everything involved in the open contest for "Agrégation" in Mathematics (written and oral tests).

## Computer Science Engineering

This course is aimed at training students in the methodologies and tools used in computer science engineering – both those already in use in the industrial sector and those more recently developed in research laboratories and in the process of integrating into the sector. This is general software engineering vocational training in the sector of distributed and interactive applications aimed at computer engineers who are expected to assume positions with a high level of responsibility.

## MIAGE

This Master's Degree was designed as a single, coherent two-year course which takes into account the skills acquired during the MIAGE Computer Science Bachelor's Degree.

## Mathematics

Training students for Mathematics Research professions for the purpose of continuing on to a Thesis.

## Informatics

Two courses are offered in the first year, one in French and one in English (first year in Mosig) with some courses in common.

## Mathematics and Informatics

This course is for 3rd year students from different 1st and 2nd year cycles who want a solid foundation in Mathematics and Computer Science. It offers training in both Applied Mathematics and Computer Science.

## Magistère Degree in Computer Science

The Magistère Degree is an academic programme of excellence mainly for students in Computer Science. It is unique in that it supplements basic teachings with "education through research", in a less formal environment than the rest of the year.

## Magistère Degree in Pure and Applied Mathematics

The Mathematics Magistère Degree is a dual-purpose programme of excellence:
- It prepares students to continue their studies in the field of research
- It provides the earliest possible preparation for the "Agrégation" in Mathematics

# To this end, students receive individual support and take specific courses.

# Coming to the University as part of an exchange program

**If you want to come to IM²AG to study as part of an exchange program, you must:**

**1.** Check with the International Relations Department at your home university and/or in your local region that there is a student exchange agreement with our University.

**2.** Contact the Head of International Exchanges for your course of study in order to agree on a curriculum, which will be validated upon returning to your home university.

**3. Please note:** Feel free to get in touch with your Internal Relations Contact person at IM²AG to check for course correspondence or other issues

**4.** Complete the application form online :
https://im2ag.univ-grenoble-alpes.fr/menu-principal/international/venir-etudier-a-l-ufr

**5.** Send the application form **by e-mail:**
ri-im2ag@univ-grenoble-alpes.fr

- to your respective International Relations contact person at the department for candidates applying through the Erasmus program,
- to the International Relations Department for candidates for non-European programs (CREPUQ, ORA, TASSEP, University of California, bilateral agreements etc.).

**6.** Before departing, you absolutely must register at your home university.

When coming as part of an exchange program, no UGA diplomas are awarded at the end of your stay.
You will receive a copy of the academic transcripts for the courses taken, specifying the number of credits obtained. The original transcripts will be sent to your home university so that the courses taken may be validated as part of your home degree.
For more information please contact:
ri-im2ag@univ-grenoble-alpes.fr

# Frequently asked Questions

## How to find accommodation
Exchange students who meet the housing office deadline are guaranteed a place in student housing.
When possible, housing office staff tries to place students in their first choice. However, because of high demand, students may be placed in their 2nd or 3rd choice.

## Application deadline:
July 1 for first semester and full-year exchanges
November 15 for second semester exchanges
http://www.crous-grenoble.fr/en/demanderunlogement/our-rental-rates

## Meals
Students can find affordable meals on campus: prices start at €3.25.
http://www.crous-grenoble.fr/restauration

## Cost estimates per month
Living expenses (estimates):
- Food 200€/month: 3,25€ /meal with student ticket
- Phone / Internet : from 30€ to 50€ /month
- Tramway student Pass 20€ / month (Grenoble metropolitan area)
- Bike rental: 15 €/mois à Grenoble (+ deposit)
- French Health Insurance : about 215 €/ year
- Civil liability Insurance : about 25 €
- Housing: from €160 to €600+ / month

http://www.crous-grenoble.fr/demanderunlogement/logement-etudiant-international

## Health Insurance
**European students:** European students are required to have a European Health Insurance Card which covers the entire period of their stay.
**Non-European students**: French National Health Insurance (the Sécurité Sociale) is mandatory. With some exceptions, incoming students without European health insurance are required to enroll in the French national health insurance plan for students at the time of registration. The cost is about 215€, and covers the period from October 1st - September 31st. Students are strongly encouraged to verify that their home insurance covers the period before October 1st.
**On main university campus:** Health Center provides consultations during regular office hours.
http://sante.univ-grenoble-alpes.fr

## VLS-TS Long Term Visa
Students residing outside the Schengen area should apply for a visa as soon as possible.
For more information about procedures and the different types of visa, please consult this page: http://international.univ-grenoble-alpes.fr/en/student/visa-and-residence-permits

## Campus Services
**Student Office:** the International Students and Scholars Office is available to assist incoming exchange students with a variety of practical matters.
http://international.univ-grenoble-alpes.fr/en/offices/offices

**International Student Association:** IntEGre brings international and French students together by organizing social, cultural, and outdoor activities, as well as student mentoring and language programs.
http://www.integre-grenoble.org

**Libraries:** Exchange students have access to multiple campus libraries and specialized archives.
http://www.univ-grenoble-alpes.fr/fr/grandes-missions/vie-etudiante/mes-outils-vie-pratique/se-documenter

**Sports:** 35 different sports are available on-campus, with classes at all levels.

**Language Support:** The UGA houses one of France's oldest and most prestigious centers for French language learning, the CUEF.
http://cuef.u-grenoble3.fr

**Amphidice:** the UGA's theater, host to a wide variety of cultural events.

**Health Center:** the UGA's health center can respond to most student health care needs on campus.
http://sante.univ-grenoble-alpes.fr

## CONTACTS

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## Our partners

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