2019 Talents

#EURECOM

En

#5G
The 5G Revolution

SOPHIA ANTIPOLIS,
NEW HOME TO ARTIFICIAL INTELLIGENCE

DNA
The Next Data Storage Revolution

#AI
AI applied to medicine

A CAMPUS OPEN
TO THE BUSINESS WORLD

 # employment survey
EURECOM engineers, what is your career path?

HIGH LEVEL EDUCATION
INTERNATIONAL RECRUITMENT

EURECOM
Sophia Antipolis

#EURECOM 4.0

THE FUTURE OF EURECOM IS TODAY

EURECOM'S RECENT SUCCESSES DO NOT GUARANTEE ITS FUTURE. AS WE PREPARE TO WITNESS SEVERAL TECHNOLOGICAL AND HUMAN DEVELOPMENTS, THE URGENCY IS TO PLAN THE FUTURE WITH THE UTMOST CARE.

Ulrich Finger

EURECOM Director

WE SPOKE WITH ULRICH FINGER, HEAD OF EURECOM FOR 18 YEARS WHO WILL PASS THE BATON IN 2020.

ULRICH FINGER, BEFORE WE SPEAK ABOUT EURECOM'S FUTURE, GIVE US A BRIEF UPDATE ON THE PAST YEAR.

It was an exceptional year for EURECOM with several records. The number of citations of our scientists has never been higher. The volume of publications per researcher puts us ahead of prestigious institutions, such as MIT, ETH (Zurich), or the Ecole Polytechnique (France).

And our turnover, which had been stagnating for about 5 years, went up 15% to reach 6 million euros. This is due to a larger number of industrial contracts and to 11 European projects awarded to our researchers in 2018, with a success rate well above the average.

WHAT ARE THE HIGHLIGHTS OF 2018?

The most important, in my view, are the framework contracts with the French Naval Group and the National Defence University of Malaysia (UPNM), the contract with the research center of the American Defense Advanced Research Projects Agency (DARPA), and of course the ERC funding of Davide Balzarotti's Bitcrumbs project offering a new way to deal with digital security issues.

David's ERC grant is the third awarded to EURECOM in three years. The competitive selection (success rate of about 10%) shows the exceptional level of our researchers.

The contract with DARPA, which was awarded to Arizona State University aims to develop a software enabling computers and humans to reason collaboratively.

As for the UPNM and Naval Group contracts, Malaysia selected EURECOM as part of an economic agreement with France to design certified training courses in digital security.

We will train NPNM's future professors in cyber-security and help them develop the content.

On top of these three major successes, we should

mention the partnership with Qualcomm through a patent factory, and the Huawei chair for beyond-5G. In other words, EURECOM is on a very promising upward track!

IF THESE SUCCESSES REFLECT EURECOM'S IMAGE OF EXCELLENCE, DON'T THEY ALSO CONTRIBUTE TO ITS REPUTATION WORLDWIDE?

Absolutely! Especially abroad, whether in the teaching or research area. Our ability to attract top-quality researchers is growing each year. This was confirmed by the QSSTAR ranking, the benchmark organization for training and research quality.

In 2018 it awarded us the maximum score of 5 stars. This award reinforces not only our reputation as a top research center in telecommunications, data science and digital security, but also our attractiveness to international students who represent two-thirds of our student population.

AND IN FRANCE?

In France, it's a little more complicated. Our strong reputation on the international stage is poorly recognized in the French higher education sphere. The fact that we don't offer an engineering program in three years is a barrier to this recognition.

EURECOM is not listed in the French engineering schools rankings, nor in the Leiden and Shanghai rankings, even if we offer Masters programs and specialist degrees.

IS IMPROVING RECOGNITION IN FRANCE PART OF YOUR PRIORITIES?

Absolutely! And it will also need to be among my successor's priorities, as my 5th term ends in September 2020. I have always worked towards enhancing EURECOM's recognition as a top engineering training institution, which in the context of the French education system means a 3-year diploma.

I rely on the Consortium's industrial members to improve this situation. The future will tell if this is a good strategy. But there are plenty of other challenges, such as finding my successor and recruiting top professors who will shape EURECOM's future. The retirement of several key administrative staff members and experienced professors puts EURECOM at a turning point.

DOES THIS MEAN THAT EACH OF THESE PROFESSORS WILL NOT BE REPLACED AT THEIR RESPECTIVE POSITIONS?

Probably not. While in terms of research contracts, telecommunications still represent half of our revenues, student ratios in this area are very different. We see a growing share of students in data science, a significant growth in digital security, and a drop in telecommunications. Inevitably, recruitments will take these figures into account.

Furthermore, we are very active in the Riviera 3IA center (Interdisciplinary Institute for Artificial Intelligence), with several partners such as the CNRS and INRIA (Institut Interdisciplinaire d'Intelligence Artificielle).

This will also require reinforcing our artificial intelligence and statistics competence.

DOES THIS MEAN THAT THE TIME HAS COME FOR EURECOM TO DEFINE ITS VISION POST-2020?

Exactly. EURECOM has changed profoundly since its creation 25 years ago. And our continued quest for excellence has led us to initiate a strategy for the future–EURECOM 3.0– that the third director will need to implement.

EURECOM's 2020 vision, our position in the French higher education system and research, our role in the Sophia Antipolis ecosystem, my successor's profile: these are some of the items we will be working on with the 14 members of our Consortium and our staff.

Because the future of EURECOM concerns everyone: our members, current and future management, and our researchers! Everyone will need to contribute to the future of EURECOM!

#3 FUNDAMENTAL missions of EURECOM

1

RESEARCH
PRIORITY HAS BEEN GIVEN TO THREE FIELDS OF RESEARCH:

DATA SCIENCE

COMMUNICATION SYSTEMS

DIGITAL SECURITY

2

HIGH-LEVEL EDUCATION

EURECOM provides several graduate programs in English: A Master level engineering curriculum, three Master's degrees accredited by the French Ministry of Higher Education and Research in digital security, mobile computing systems, and data science for foreign students.

Two Post Master's degrees in communications for intelligent transport systems, and in security in computer systems and communications.

EURECOM also trains PhD students in various key areas related to communications, information processing, signal and imaging, and security.

3

INNOVATION & TRANSFER TOWARDS INDUSTRY

Opening new paths towards future and emerging technologies, and establishing partnerships with companies to enhance knowledge transfer to tomorrow's industries are two key strategies of EURECOM's policy.

EURECOM supports its students' and researchers' startup projects with the Télécom ParisTech EURECOM incubator.

Key FIGURES

148 people in research and teaching:

120 scientists (including 65 doctoral students)

28 administrative and support staff

28 nationalities

€13.3M

2018 global budget with a project turnover of

€6.3M

115 contracts managed in 2018 including:

25 European contracts

33 National contracts

57 Industrial contracts

291 International scientific publications:

114 co-signed with foreign institutions

H-Number: 27

Filiale de

Institut Mines-Télécom

#5G Experts in parliament

On June 27, 2019, the Commission Supérieure du Numérique et des Postes organized a breakfast debate in Paris for French parliamentarians on the theme "Cybersecurity and sovereignty of 5G networks: myths and realities" with presentations by Francis Jutand, Deputy Director General of the Institut Mines-Télécom and two EURECOM experts, David Gesbert, Head of the Communication Systems Department and Aurélien Francillon, Assistant Professor in the Digital Security Department, in the presence of Mrs Laure de La Raudière, Member of Parliament (Eure-et-Loire), Mr Jean-Michel Houlegatte, Senator (Manche), and Mr Jean-Paul Dufregne, Member of Parliament (Allier) and of the CSNP.

On 24 July 2019, the French Parliament adopted the law securing the deployment of 5G in France.

News Highlights

This is an opportunity for me to thank all the staff at EURECOM and Télécom Paris, the students and staff at SAP, and the city of Antibes for their invaluable support.

Alberto Ibbarondo

EURECOM in the Spotlight at the Award Ceremony for the Best Internship of the Fondation Mines Télécom

Each year, the Fondation Mines Télécom recognizes the best end-of-study internships in Institut Mines Télécom schools. The ceremony for the best 2019 internships took place on March 27 at the Orange Campus, in Montrouge. The 1st 2019 prize goes to Alberto Ibbarondo, from EURECOM, for his internship at SAP Research Lab on "Security For Deep Learning". Alberto also won the "Coup de Coeur du public".

"As a EURECOM student, it was with great pleasure and pride that I received the Fondation Mines-Télécom's prize. I carried out my Master's dissertation "Security For Deep Learning" at SAP Labs France under the direction of Laurent Gomez and the supervision of Melek Önen, my teacher at EURECOM."

International Development

A GROWING VISIBILITY

>> PHILIPPE BENASSI

International Relations Manager

Promoting diplomas, strengthening EURECOM's identity in France and abroad while asserting the school's specificities, these are some of the continuous challenges taken by the International Relations Department.

PHILIPPE BENASSI, WHAT HAS BEEN YOUR MISSION SINCE YOU JOINED EURECOM IN 2017?

My role is to continue promoting EURECOM's diplomas to international students and run the operations of the European programs signed in 2017. They include many first-class European universities.

A GROWING VISIBILITY

Asserting the academic identity of the school, and increasing its visibility in France and abroad is a multi-tier task. Concerning EURECOM's identity and visibility, much work has been done to ensure that EURECOM is listed amongst world-class institutions: we have been independently assessed by Quacquarelli Symonds (QS)–the benchmark organization for ranking and labelling universities worldwide–and we are proud and pleased to have received the maximum rating of 5 stars (out of 5) with special appreciation to the excellence of our teaching, the employability of our graduates and the quality of our infrastructure.

We are also proud to be listed–for the first time in history–in the latest QS ranking, amongst internationally renowned universities. This is encouraging and it helps us start a virtuous circle that will allow us to improve our international visibility.

In France, we have worked hard to have our two security diplomas recognized (Master in Digital Security, Post Master Degree in Security in Computer Systems and Communications) and have obtained the SecNumedu label from ANSSI which tests and guarantees the relevance of our training courses in relation to their objectives.

Finally, EURECOM is listed on the main international recruitment sites so we can promote our school on the web to the very students we are targeting. We recorded a 40% increase in applications during the 1st recruitment session.

INTERNATIONAL SCOPE AND EUROPEAN PROGRAMS

To continue developing our international scope, which is part of EURECOM's DNA, we implemented the SECCLO and EIT Digital programs.

In October 2018, we received the first group of 5 students from the Master in Cyber Security from EIT Digital, and the next group of 12 of these top students will arrive in the coming fall: 8 in Digital Security and 4 in Autonomous Systems. These students will join our Master classes.

EURECOM is also a member of the Erasmus Mundus consortium through the SECCLO program, and we will receive 7 students next September who will follow a curriculum in Cloud Computing and Security.

ACADEMIC INTEGRATION WITH DOUBLE DIPLOMAS:

In addition to extending the Double Degree Agreement with the Technical University of Prague (CTU) to the IOT Master, this year we signed two Double Degree Agreements with Aalto which connect our Master in Data Science and Engineering and the one in Mobile Computing System with the Master of this historical academic member of EURECOM.

We are also close to signing another double degree agreement with the University of Chalmers, in Sweden, for our Master in Mobile Computing.

Finally, and still with a view to furthering our ties with the Institut Mines Telecom (IMT) schools, of which we are a part, discussions are underway with some of the group's schools (Mines Nancy, Mines Saint Etienne) to sign double degree agreements for our two Post Master engineering programs in Connected Vehicles and Security in Computer Systems and Communications.

OUR PARTICIPATION IN EDUCATIONAL FORUMS

EURECOM boasts strong participation in the key forums dedicated to education (NAFSA, APAIE, EAIE). The goal is to foster our connections with top universities which may one day join our consortium.

MY LOVELY EXPERIENCE AT EURECOM

Ahmad Caracalli, Lebanon

We all have a dream and like to be successful. To do so, we need a vision. Without it, we succumb to the ordinary, and what every ambitious person should always aim for is to be extraordinary.

After being admitted at Télécom ParisTech, I enrolled in EURECOM's 24-month curriculum. What an extraordinary opportunity these two years have been! A genuine turning point in my life. I feel grateful when I think about how much experience I have gained at EURECOM, looking at where I am today and where I was two years ago. It's a definite boost on a professional level!
The professors are intelligent. They keep abreast of realities of markets through their assignments, lab work, and projects, so you have a clear idea about how professional people work and the current technologies used by the industry. They are also available outside the classroom.

The environment is very helpful too. You will be surrounded by inspiring people, learn from each other through group work, and get help whenever you need. Everybody is working hard! A special thanks to the staff who is always there for help and support, and to make you will feel at home. So all is left for you is to be successful and study hard to reach your goal.

This exciting story ended at Siemens where I did my 6-month internship. The experience I gained at EURECOM paved the way for this great experience and gave me the ability to step safely into my future professional career.

Whenever I think of EURECOM, these key words come to my mind: success, challenge, experience, professionalism, hard work, competition, networking, friendship, international, and family.

Yours Sincerely, Ahmad

EURECOM offers

4 Masters in Booming Fields

Come and study cutting-edge Master degrees taught by internationally renowned experts in high rate employment sectors.

MOBILE COMPUTING SYSTEMS
DIGITAL SECURITY
DATA SCIENCE AND ENGINEERING
INTERNET OF THINGS

EURECOM's Master's programs ("Diplôme National de Master") are 100% taught in English and fully accredited by the French State and co-delivered by the Institut Mines Télécom.

Get a competitive edge with our

2 Post Masters

COMMUNICATIONS FOR INTELLIGENT TRANSPORT SYSTEMS

SECURITY IN COMPUTER SYSTEMS AND COMMUNICATIONS

EURECOM's Post Master degrees are 100% taught in English and are state recognized: accreditation by the CTI (official French accreditation body of engineering studies)

The EURECOM programs bear the quality label:

#INDUSTRIAL sponsorship

Each year, EURECOM gives a company the opportunity to support and work with a class of masters students, from the time they are admitted through their graduation. A tradition rooted in the engineering school since its creation.

Sponsoring a class of students is an opportunity to showcase the privileged connection between EURECOM and industry, as well as the quality of its training through companies–key elements of today's socio-economic reality. These sponsorships also allow companies to be in direct contact with the next generations of engineers and to put forward their brands as employers.

SPONSORSHIP ACTIONS

The sponsorship establishes an annual endowment to the Student Office and provides for numerous and regular exchanges between the company and the engineering students through conferences, roundtables, job interview simulations, visits to industrial sites, business meetings, or student project development. For companies, these actions are a way to raise awareness about their business lines and markets as well as the careers they can propose young graduates. In return, students have a concrete grasp of the partner's business.

"SAP LABS FRANCE WAS VERY HAPPY TO SPONSOR EURECOM'S CLASS OF 2019

"SAP is always looking to further its relationships with local schools via its NextGen Program, and EURECOM is an excellent example of a fruitful long-term collaboration between academic and industrial partners.

Through this sponsorship, EURECOM's students gained in-depth knowledge of SAP's business and its needs, and had direct access to our open positions, and our PhD & internship openings. Our collaboration extended beyond the scientific context to sporting events, which are a key element of our working culture."

>> Olena Kushakovska

Director, SAP Labs France, Sophia Antipolis

Class mentor, **a key role!**

“ WE ARE PROUD TO BE THE SPONSOR OF THE EURECOM CLASS OF 2020 AND EXPECT TO BE A LAUNCHING RAMP FOR FUTURE AMBITIOUS TALENTS

>> Antoine Clerget

Site Director, Symphony, Sophia Antipolis

A UNICORN AS A GODFATHER

One year after creating its R&D center in Sophia Antipolis, the Unicorn Symphony officially inaugurated its new offices and assessed its activity in Europe’s largest technology park, in the presence of Cédric O, Secretary of State for Digital Technology & David Gurlé, founder and CEO of Symphony with representatives of the Sophia Antipolis ecosystem in attendance.

SOPHIA ANTIPOLIS, A BREEDING GROUND FOR TALENTS!

The start-up, which has just raised a record amount of funds, is betting on the Côte d’Azur Science Park and is working with EURECOM to recruit the profiles it needs to pursue its development and create innovative solutions that will help companies develop their traditional collaborative tools.

SYMPHONY

INAUGURATION OF SYMPHONY'S NEW PREMISES IN SOPHIA ANTIPOLIS

JULY 5, 2019

#Campus Insider

@BureauDesSports Merci pour cette année active! #canyoning #aventuresouterraine #weekendski

@BDE #TEAM2019 #BedSame Mucho #çabougeàEURECOM

@BDE #PROMO2020 #BedSameMucho #international #espritdepromo #dancing #playing #cotedazur

@BDE #découverte #integration #voyageenEurope #Vienne #Budapest #PROMOTRIP

“EURECOM, CHAMPION OF MULTICULTURALISM!

Hello!
What makes a great school experience is a matter of different metrics. Surely a high academic level is fundamental, but other factors can and should be as important. Internationality and connectedness, combined with a quality education, make EURECOM one of the best options for schools in France.

The level of internationality is one of our school’s most noticeable features, with more than half of the student body coming from every corner of the world. That means courses in English and a sense of a true international experience, all within the beautiful French Riviera. Students at EURECOM become forever aware of the world out there.

Manuel, President of the BDE

We make it our mission to organize as many social-bonding events as possible, with the purpose of creating long-lasting connections that will help you as graduates in the future ahead of you. Lastly, we are lucky enough to have a highly sought after group of professors and an administrative group to make sure we’re given an educational program matched only by the best. As part of the people living the experience, and part of those building it, I’ll be delighted to welcome you” Manuel

A CAMPUS OPEN TO THE BUSINESS WORLD

#ForumTeam2019 #networking #coachingCV #entreprises

Putting the company at the heart of engineering training is a strategic axis chosen by EURECOM since its creation.

To help students in their search for an internship and professional orientation, the school jointly organizes with a team of students the EURECOM Business Forum, which each year offers students a unique opportunity to initiate fruitful exchanges with companies that offer internships and recruitment and career opportunities.

It is also an opportunity to meet former students who share their experience and have become, in turn, potential recruiters.

Jeanne Grenier • 1st
Master degree in cybersecurity
1mo

Thank you **Ulrich Finger, Laurence Grammare, Gwenaelle Lestir, Chantal Guizol, Philippe Benassi, Ken Pope MBA** and everyone working at EURECOM

At the Concours Grandes Écoles, I was accepted by Télécom Paris, but at the Sophia Antipolis campus, not Paris. So I was a little disappointed. But then I arrived at EURECOM!

A school where you can choose all the courses you like, from Hardware Security to 3D movies, from machine learning to entrepreneurship. And all 100% in English! Their professors are always available, and there is a lot of lab work and projects.

Another differentiating factor is its administration staff that knows you, and who always lends a sympathetic ear to your requests (yes, yes!). They will make sure that each student succeeds and can study in a “safe environment”.

Thank you for this wonderful year at EURECOM which made me better, technically and humanely. When I arrived I said that I was from Télécom Paris Sophia, when I left I said that I was from EURECOM.

For more information, watch this Campus Channel video which sums up life at EURECOM:

EURECOM - engineers

employment survey

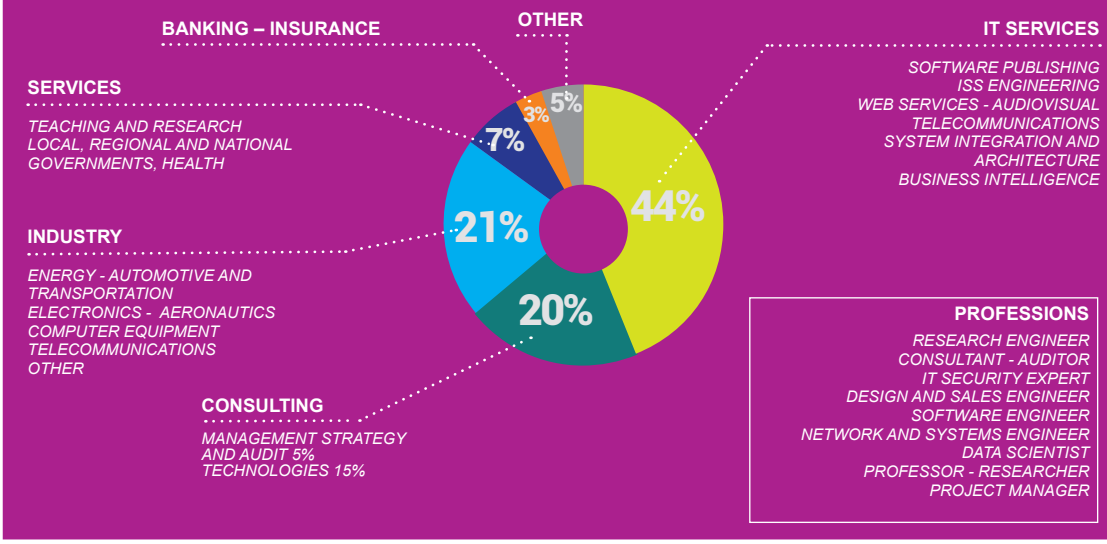
WHAT IS YOUR CAREER PATH?

Survey conducted among graduates of the last three promotions

VERY SOUGHT-AFTER PROFILES!

Professions 3.0 - The digital professions are in full disruption. New job names are emerging every month and companies are struggling to recruit suitable profiles. This is good news for EURECOM engineers who have the choice between several career opportunities before the end of their end-of-study internship.

INDUSTRIES



PROFESSIONS

RESEARCH ENGINEER
CONSULTANT - AUDITOR
IT SECURITY EXPERT
DESIGN AND SALES ENGINEER
SOFTWARE ENGINEER
NETWORK AND SYSTEMS ENGINEER
DATA SCIENTIST
PROFESSOR - RESEARCHER
PROJECT MANAGER

6 months after graduation

86% are working
14% are in doctoral programs

Current status (+2 to 3 years)

95% are working
5% are enrolled in graduate programs

Employers

90% are private companies
8% are public institutions
2% are self-employed

STATE-OF-THE-ART TRAINING FOR A SMOOTH TRANSITION TO WORKING LIFE

Artificial intelligence is one of the most sought-after skills!

Information systems, data science, systems integration, cyber security, system architecture, software engineering, web technology, Internet of things and services are among the most in-demand skills.

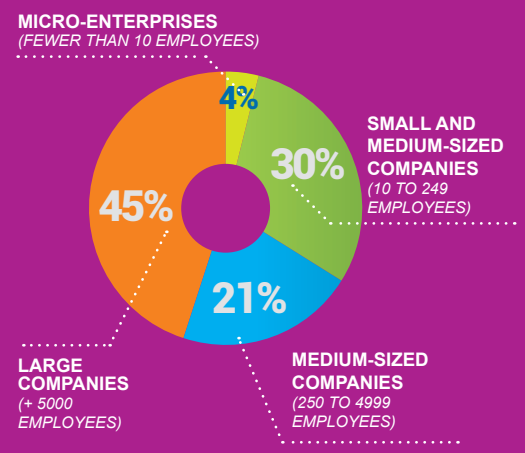
#1 position: IT design and development
40% in 2019
39% in 2014
17% in 2011

L'INFORMATIQUE COMMUNICANTE
MANHATTAN ASSOCIATES SOUTH EUROPE
MERH-IP
MICROSOFT
MINISTERE DES ARMÉES
MNEMONIC
MONDECA
MY JOB GLASSES
NETATMO
NOKIA NETWORKS
OPENVALUE
ORANGE
OTTO GMBH
PAYFIT
PENTLAND FIRTH SOFTWARE GMBH
PINDUODUO INC (NASDAQ: PDD)
PROVE & RUN
PSA GROUPE
QUARKSLAB
QVEST MEDIA GMBH
RHEA
SAFRAN
SAMSUNG ELECTRONICS
SBM MONACO
SCHIBSTED
SOPRA STERIA
SOUNDCLOUD
SPIKE REPLY
STREAMROOT
SYSDIG
TCL
THALES
TÜV SÜD
UBISOFT
UNIVERSITÉ DE MONTPELLIER
VALEO
VERIZON
WAVESTONE
WITHINGS
XPO LOGISTICS
XYLON D.O.O.
YELLOSTORY GLOBAL (KOREA - VIETNAM)
YELP

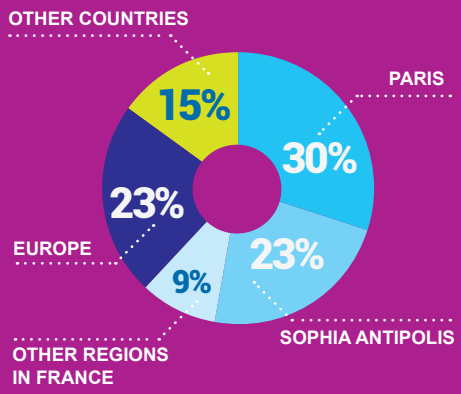
REFLECTING ON THE MOBILITY OF THE FUTURE, IMPLEMENTING SECURE SOLUTIONS FOR DIGITAL LIFE AND DEVELOPING HUMAN-MACHINE INTERFACES ARE SOME OF THE CHALLENGES FACING ENGINEERS TRAINED AT EURECOM

The most important areas of activity are IT security, consulting in digital technologies and innovation, data processing and hosting and software publishing.

COMPANY SIZE



WHERE THEY WORK

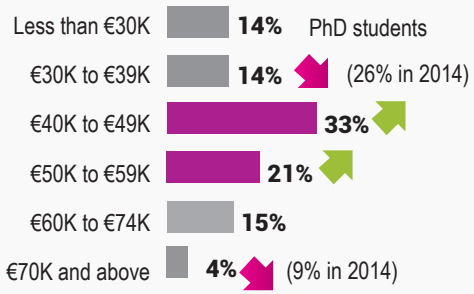


COMPENSATION ON THE RISE

Average gross salary (+2 to 3 years)

€48K *Increase of variable part and in-kind benefits*

€42K Average gross salary for the 1st employment



AALTO UNIVERSITY
A.A.U
ACCENTURE
AIR FRANCE
ALTRAN
AMADEUS
AMAZON
ANTELOP
ARM
AUREA
TECNOLOIGA
AUSY
BEARINGPOINT
SWITZERLAND AG
BEIJAFLORE
BLABLACAR
BLOCKPAYD AB
BMW GROUP
CAPGEMINI
CARA BY HIDOC
TECHNOLOGIES
CATENA MEDIA
CISCO
CREAMINAL
DATADOG
DELPHI
TECHNOLOGIES
DUAGON
EURECOM
FACEBOOK
FLIGHT MATE AB
FORTINET
FREELANCE
GOOGLE
GOPRO
GOLDMAN SACHS
HAWE HYDRAULIK
IBM
ILLUIN
INFINEON
INFOVERITY
ITRON
IWE
JALGOS
KAYRROS
KEBA
KEYRUS
KPMG
LASTLINE

#TESTIMONIAL

>> Fayçal Fassi Fehri

Strat at Goldman Sachs, Promo 2018

I had the opportunity to study at EURECOM and to follow the Data Science Track. I had a great experience there, from both the academic and human angles. Indeed, the teaching and courses are of high quality, perfectly combining theory and practice, and the international atmosphere makes you meet people from all over the world.

After EURECOM, I decided to do a master in Mathematics and Finance at Imperial College, with the objective of combining both data science and finance for my future professional career. It should be recalled that today, Data science can be applied to a broad range of sectors, one of them being finance.

> **“A SOLID BACKGROUND IN DATA SCIENCE !**

Then, I did my first internship as a quantitative analyst at HSBC where I had to use machine learning to develop a financial model. After that, I joined Goldman Sachs in London where I also worked as a quantitative analyst. The overall goal of a strategist is to solve complex financial problems by using different skills such as mathematics, programming or data analysis/science. I focus more specifically on problematics related to the optimization of capital and liquidity.

EURECOM allowed me to have a strong background in Data Science and to develop my skills in machine learning, programming, and Cloud Computing. Moreover, the broad variety of projects, and especially the ones done during “Algorithmic Machine Learning” or “Distributed Systems and Cloud Computing” courses prepare you perfectly for your first internship.

Finally, I would like to take this opportunity to thank the professors as well as the administrative staff that were always available when I needed them. This makes EURECOM the great school it is!

BMW Summer School **2019** shines the spotlight on "**Artificial Intelligence** & Urban Living"

Munich. As an initiative from the BMW Group Research division, the BMW Summer School provides junior scientists from all over the world with a regular opportunity to discuss their research with top-class experts from both theoretical and practical backgrounds. This year's get-together took place in Lenggries-Fall, Bavaria on 15 – 20 July 2019 under the auspices of the French consul general, and was staged in collaboration with EURECOM, the Technical University of Munich (TUM) and BayFrance with the support of the "Université Franco Allemande", the Digitalist Group and the German-French Academy for the Industry of the Future.

The BMW Summer School provides for dialogue with established professionals from academia and industry combines with the participants' multidisciplinary backgrounds to give the event its distinct identity. This year, young researchers from the fields of computer science, mechanical engineering, electrical engineering, civil engineering, psychology, law and industrial design got together. "We see the BMW Summer School as a benchmark for cooperation between industry and universities", said Hannemor Keidel, TUM representative for scientific relations with France.

ARTIFICIAL INTELLIGENCE IS TRANSFORMING MOBILITY AND URBAN LIVING

"Advances in the field of artificial intelligence have a major role to play in shaping the future of mobility," commented Michael Würtenberger, Head of the Excellence Cluster for AI at the BMW Group. "The BMW Group identified AI as a vital research area at an early stage and set up the requisite development expertise." The influence of AI extends far beyond mobility into day-to-day life, future production methods and business processes; AI therefore affects society as a whole. The interdisciplinary nature of the BMW Summer School 2019 made it the ideal forum for highlighting to participants the social relevance of their research topics.

BMW Summer School: the sharing of scientific knowledge between the worlds of theory and practice across three main areas.

To facilitate an intense exchange between the junior researchers and the experts from science and industry, the programme for the BMW Summer School 2019 was organised into three main areas.

Highlights from the keynote track, for example, included a talk by Carlo Ratti, who heads the Senseable City Lab at the Massachusetts Institute of Technology (MIT). Ratti: "Large cities worldwide are facing enormous challenges. Big Data and AI can give us better knowledge of the urban environment, and thus their potential beneficial applications are countless. This requires a new generation of researchers to think and collaborate across disciplines and it is great to see this kind of thinking fostered by the BMW Summer School". There were also breakout sessions that gave the participants the chance to discuss specialised topics in small groups with academics and industry representatives. The issues up for debate included the use of AI for mobility services, design thinking methodology, quantum computer technology and ethical considerations relating to the interaction between human and artificial intelligence. "The successful development of smart cities relies on the harmonization between people, mobility solutions and infrastructure and their mutual cooperation.

BMW SUMMER SCHOOL

We are expecting artificial intelligence and 5G to be catalysts for smart cities", said Weiyun Jiao from the Chinese National Center for Intelligent Transport Systems in one of the sessions.

The poster track centred on the fields of research pursued by the up-and-coming scientists. The participants presented the ideas behind their current research and its objective to the multidisciplinary audience in a competition format.

The third key element was the lean startup machine. The participants were split into mixed groups, asked to develop innovative product and service ideas based on their research topics under the guidance of agile design coaches and eventually present them to the audience in a short pitch. This competition gave the young researchers a realistic impression of what putting technological innovations into practice entails, be it in the form of a business idea or company startup.

In addition to the three main elements of the BMW Summer School 2019 programme, the PhD students also seized the opportunity to share ideas informally among themselves and with the assembled science and business experts.

This allowed them to gain some inspirational insights into the research work carried out in various disciplines and its practical application in the industrial sector.

CAR 2 CAR COMMUNICATION CONSORTIUM

From 1 to 4 July 2019, EURECOM hosted the 6th workshop of CAR2CAR consortium

Enhancing road safety and traffic efficiency by means of Cooperative Intelligent Transport Systems and Services (C-ITS)– this is the dedicated goal of the CAR 2 CAR Communication Consortium.

More than 55 experts from the CAR 2 CAR Communication Consortium, divided into 12 competence groups, participated in the working meetings on site. Other experts joined in videoconference sessions. The roadmap for this work week was examined by three thematic working groups: DEPLOYMENT, OPERATION and TECHNICAL.

On the agenda for the discussions: (among many other technical topics) the progress of work on the collective perception of connected and cooperative automatic driving, as well as spectrum and radio issues, road mapping, road works alert systems, not to mention equipment safety issues and automotive requirements.

The industrial driven, non-commercial association was founded in 2002 by vehicle manufacturers affiliated to the idea of cooperative road traffic with Vehicle-to-Vehicle communication (V2V) supported by Vehicle-to-Infrastructure communication (V2I).

In the course of the years, further vehicle manufacturers, equipment suppliers, research organizations and other partners have joined the Consortium. Down to the present day, it has evolved into one of the key players in preparing the initial deployment of C-ITS in Europe, and next innovation phases.

EURECOM is a member of the consortium and brings its expertise in the development of new technologies.

CAR 2 CAR members focus on wireless V2V communication applications based on ITS-G5 and concentrate all efforts on creating standards ensuring the interoperability of cooperative systems spanning all vehicles classes, across borders and brands. As key contributor, the C2C-CC works in close cooperation with the European and international standardization organizations like ETSI and CEN.

Sophia Antipolis new home to Artificial Intelligence

AS PART OF THE FRENCH STRATEGY FOR ARTIFICIAL INTELLIGENCE (AI) ANNOUNCED BY PRESIDENT MACRON ON MARCH 29, 2018, AN AMBITIOUS NATIONAL RESEARCH PROGRAM WAS LAUNCHED BY THE MINISTER OF HIGHER EDUCATION, RESEARCH AND INNOVATION AND THE SECRETARY OF STATE FOR DIGITAL TECHNOLOGY.

The labelling of an Interdisciplinary Institute of Artificial Intelligence in the Alpes-Maritimes places Sophia Antipolis in a strategic position in the world of innovation.

EURECOM, A FOUNDING MEMBER

EURECOM is a founding member and a strong supporter of the 3IA Center of the "Region SUD", involving Inria Sophia Antipolis, UCA, CNRS, and many other academic and industrial actors in Sophia-Antipolis.

Our participation is part of a strategy to harmonize and coordinate activities developed around artificial intelligence and machine learning so that the entire territory can benefit from the skills and expertise of each institution.

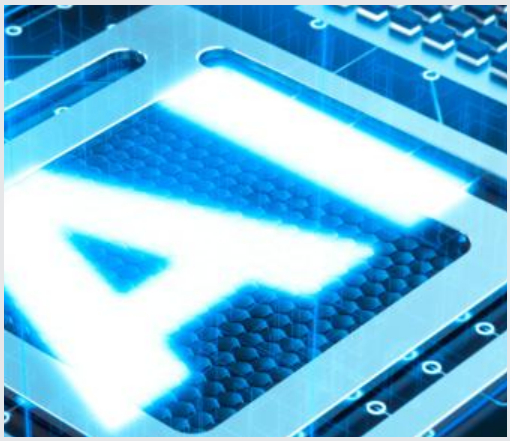
CONTRIBUTION

The Data Science Department of EURECOM brings its world-renowned expertise and reputation in the field of statistical machine learning, multimodal data processing and knowledge engineering which empower artificial intelligence systems, and the school is proud to be considered as an example to follow for its interaction with the local industry:

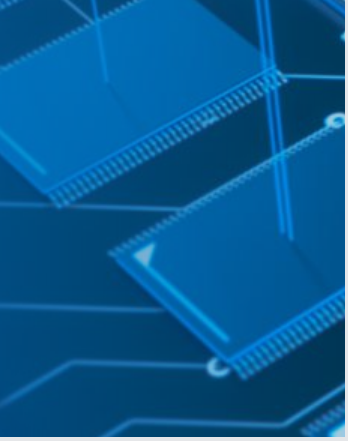
EURECOM's partnership with SAP Labs Sophia Antipolis is a great example of our ability to interact with industry and to transfer the skills of our researchers and professors for application in an industrial environment. In this particular case, the focus is on one of the major challenges of AI research: its explainability. SAP and EURECOM have also established a joint collaborative AI platform, with cutting-edge hardware such as the NVIDIA DGX-1.

Within the 3IA, EURECOM's contributions will mainly focus on the development of the fundamental methodologies of artificial intelligence, including key aspects such as uncertainty quantification, interpretability and explainability, and algorithmic efficiency and scalability.

Additionally, EURECOM will contribute to the application domains behind 3IA, namely life/medical sciences, urban mobility and its services for smarter cities, autonomous vehicles and many more.



HOW TO CREATE A SYSTEM CAPABLE OF MAINTAINING MILLIONS OF BUSINESS SOFTWARE OF FULLY OPERATING COMPANIES? A SYSTEM THAT COULD FIRST RECOGNIZE THEIR OPERATIONAL STATUS BY CONTINUALLY ANALYZING LOG ENTRIES, THEN ANTICIPATE ANY POTENTIAL MALFUNCTION, AND FINALLY DETERMINE THE CORRECTIVE ACTION TO AVOID SHUTDOWN? A QUESTION POSED BY SAP, THE GERMAN BUSINESS SOFTWARE GIANT ABOUT "PREDICTIVE MAINTENANCE".



SAP LABS AND EURECOM RISE TO THE PREDICTIVE MAINTENANCE CHALLENGE

Meeting with Pietro Michiardi, Head of the Data Science Department, and Olena Kushakovska, Director of SAP Labs France

Interview by Jean-Pierre LARGILLET

MAINTAINING MILLIONS OF SOFTWARE PROGRAMS WORLDWIDE

To rise to the challenge, SAP Labs in Sophia Antipolis, the group's largest R&D center in France, turned toward artificial intelligence and partnered with EURECOM. Specialized in digital science, the engineering school's research center is well-known for its work in AI and is also located in Sophia Antipolis's science park.

"SAP has vast experience in the maintenance and management of its own software systems that are sold around the world to tens of thousands of customers, including corporations, medium size businesses, and an increasing number of businesses delocalizing to the Cloud," says Pietro Michiardi, researcher and Head of the Data Science Department at EURECOM.

"These are cloud services and software programs installed on the client's system that must remain properly configured and can be impaired over time, leading to potential failures."

"To guarantee their maintenance, SAP has developed a system of log analysis (raw data) generated by the software.

The log entries provide a view of how the system is functioning and its state. Highly specialized engineers tasked with analyzing the raw data have written rules that allow them to ascertain the state of the system: Green light, all is well; Yellow, beware; Red, serious problem that needs immediate attention. The analysis system was developed by hand, and because SAP's clientele is vast, it needs to be scaled up by pushing for automation." And this involves resorting to AI.

A "CO-INNOVATION" PARTNERSHIP SEALED IN 2017

As for the idea of a partnership between academic research and industrial expertise, it came naturally. SAP and EURECOM already worked together. "We have been part of the EURECOM Consortium for about ten years, and our relations are very close", says Olena Kushakovska, Head of SAP Labs France SAS in Sophia Antipolis. "In the past, our collaboration centered mainly on digital security, but for the last three years, artificial intelligence has been at the heart of SAP's strategy with "intelligent business" being the focus." In light of EURECOM's expertise in this area and our still limited resources specialized in AI, the partnership was an obvious step."

"Of course, we already have several intelligent applications", adds Olena Kushakovska. "Our HANA databases have predictive analysis functions, combining methods from different branches of mathematics capable of extracting information from data to predict future trends.

SAP also acquired Kxen, a specialist in predictive analysis, in 2013. We also have diagnostic tools that help our experts to fine-tune these databases. But our goal is to help them further by optimizing the automation of these settings. The partnership was put in motion in 2017 with the integration of a EURECOM doctoral student who is working on his thesis in our offices, with easy access to the HANA databases. This is what we call co-innovation."

A THREE-YEAR PROGRAM

The research center also benefits from the partnership. The first advantage is to have access to real data to develop models and realistic working hypotheses. "Whether it's about data distribution or their values, or the computational complexity, this will all help build concrete and efficient statistical models that can predict results with a high interval of confidence," adds Pietro Michiardi.

The three-year program will be developed in three stages. The first stage is the development of the system which will replicate what humans can do with success: a machine which generates an "explicable" return. The second stage deals with failure prediction, i.e. being able to use log entries to detect potential failures with a two-month perspective. The third step is predictive maintenance, or knowing what we need to do now to avoid a critical issue in the future.

FUNDAMENTAL RESEARCH SERVING INDUSTRY 4.0

This work is not only interesting to SAP. Leveraging its expertise in Artificial Intelligence, EURECOM is involved in other predictive analysis projects with key players of the Riviera ecosystem. The research center is collaborating on autonomous vehicles with BMW, a member of its Consortium, and with Renault through the Software Lab Renault just opened in Sophia Antipolis.

In the travel industry, several partnerships have been concluded with Amadeus, one of which is in the area of methodology and algorithms for automated learning and AI. Another agreement is pending in medical imaging with Media Technologies, a start-up on the Riviera and pioneer in predictive medicine. The goal is the same: leveraging fundamental research to apply AI's power in Industry 4.0.

#5G and beyond!

Qualcomm, EURECOM and IMT join forces to prepare for tomorrow's 5G

5G is currently entering its second phase of development, with a host of new technical challenges and technological innovations to come. Research and industry are therefore on the bridge to meet the challenges of the next generation of mobile communications. In this context, Qualcomm, EURECOM and the ITM have just signed a partnership agreement that also includes France Brevets. The objective? Better prepare 5G standards, and bring technologies out of the lab as quickly as possible. Raymond Knopp, a researcher in communication systems at EURECOM, presents the content and challenges of this collaboration.

WHAT DOES THE PARTNERSHIP WITH QUALCOMM AND FRANCE BREVETS BRING YOU?

Raymond Knopp: As researchers, we work closely on 5G technologies. In particular, we are interested in those that are closely scrutinized by 3GPP, the international standardization body for telecommunications technologies. To bring research out of our laboratories, much of our work is carried out in collaboration with industrialists. This allows us to be more relevant to the issues facing technologies in the field.

Qualcomm is one of these manufacturers, and is one of the most important companies in the generation of intellectual property on 4G and 5G systems. From my point of view, it is also one of the most innovative in the field. This partnership with Qualcomm allows us to have a more direct impact on technology development. By adding France Brevets, we will be able to play a more important role in defining 5G standards. We have a lot to learn in the generation of intellectual property, and these partners bring us this knowledge.

WHICH TECHNOLOGIES ARE CONCERNED BY THIS PARTNERSHIP?

RK: 5G is currently in the process of entering its second phase. The first phase aimed at introducing new aspects of network architecture and new frequencies. Roughly, it was a question of increasing the frequency throughput by a factor of 5 to 6. This phase is now being implemented so innovations are secondary.
The technologies we are working on are more related to the second phase. It is more oriented towards private networks, applications with machines and vehicles, new network control systems. There will be much more space given to network cutting and software-defined network (SDN) technologies for example. This is also the phase where low-latency and very high robustness communications will be developed. All these technologies on which we are working are involved in this partnership.

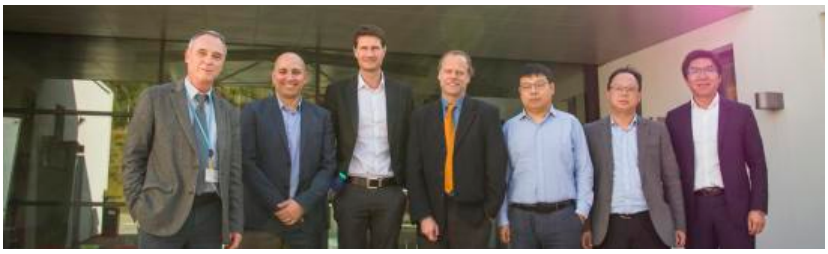
ARE YOU ALREADY THINKING ABOUT THE IMPLEMENTATION PHASE OF THE TECHNOLOGIES DEVELOPED IN THIS SECOND PHASE?

RK: For the moment, our implementation RK: For the moment, our implementation work is very much oriented towards the technologies of the first phase. In particular, we are involved in the H2020 5Genesis and 5G-Eve projects, which allow for the implementation of tests on 5G, both for mobile terminals and for the network part. These tests involve our OpenAirInterface platform. So for the time being, the implementation of the technologies of the second phase is not on the agenda. However, it is clear that the intellectual property and potential standards that will be generated in partnership with Qualcomm may potentially be subject to implementation testing on our platform. However, it will take some time before we get to that stage.

WHAT DOES THIS KIND OF PARTNERSHIP WITH AN INDUSTRIAL COMPANY MEAN TO YOU AS AN ACADEMIC RESEARCHER?

RK: This is a golden opportunity to close the loop between research, prototyping, standardization and industrialization, and to see our work go directly into the 5G technologies we will use tomorrow. In the academic world in general, we tend to be monodirectional.

We produce publications, some of which contain things that could be promoted in standards and norms, but we do not do so and leave them accessible to all. Obviously, it is the companies that are taking over behind it without us being involved, and that is unfortunate. Building partnerships like this with Qualcomm also means learning how to capture the value of our technologies and develop them together. I hope that this will encourage more researchers to proceed this way. French academic research must be made aware of the importance of closely monitoring standardization and industrial processes!



HUAWEI

EURECOM and Huawei Technologies France are proud to announce the creation of a Research Chair on Advanced and Intelligent Wireless Networks as part of the future 6G

>> Raymond Knopp

Professor, Communication Systems Department

President of the OpenAirInterface [OSA] Alliance

>> Marios Kountouris

Assistant Professor,

Communication Systems Department

Principal Researcher of the Chair

The Chair, located at EURECOM in Sophia Antipolis, is a key step in a historic partnership that began in 2014 with the opening of a Huawei' research laboratory in Boulogne Billancourt managed by Dr. Merouane Debbah.

This new large-scale collaboration, under the supervision of Prof. David Gesbert, Head of the Communication Systems Department at EURECOM, will span over five years. Marios Kountouris, recruited as professor and head researcher of the HUAWEI Chair, will be tasked with setting up a high-level research team devoted to research on the future 6G.

5G AND BEYOND!

The Chair will attempt to address the fundamental scientific issues raised by the new challenges in the post-5G context. This concerns specifically the development of intelligent and autonomous methods for the allocation of spectrum resources. The techniques developed will have to make it possible to cope with the explosion of radio services and terminals, from personal Internet access terminals, to connected sensors for the smart city, network-assisted automatic driving, and connected robots.

"These future service needs represent an extraordinary challenge for future wireless networks. It also makes it unlikely that 5G, already almost standard, will be the ultimate and definitive solution. On the other hand, we believe that a major change in the design of the system is needed, both in terms of radio access and in the way services are orchestrated and resources are allocated" said David Gesbert, Chairholder.

These new scenarios combine seemingly irreconcilable requirements, requiring both high spectral efficiency and ultra-short response time at an affordable cost!

The research team will capitalize on the expertise of EURECOM's Communications Systems Department in the field of mathematical analysis of wireless networks and the invention of data communication algorithms that are efficient in throughput, reliability, and latency.

For Huawei, calling on EURECOM experts to consider 6G is the natural continuation of a collaboration that began a few years ago. "Huawei wishes to strongly support fundamental research on the technological breakthroughs that will be deployed by 2030. We are already reaching the theoretical limits of the 1948 telecommunications laws and we need new scientific approaches to thoroughly review our models. EURECOM is today the best European research center in advanced wireless technologies and this chair is an opportunity to sustainably develop future methodological and algorithmic skills for telecommunications in France," says Merouane Debbah, Director of the Huawei laboratory in Paris. The first expected results will be made public at the end of 2019.

Data Science

#DNA STORAGE

THE NEXT DATA STORAGE REVOLUTION

In the age of big data, DNA storage is surely a way of replacing hard disks and solid-state drives as we know them today.

Raja Appuswamy, an expert in data management software, has joined the Data science team in 2018.
For sure, he will help make EURECOM a major player in DNA storage.

>> Raja Appuswamy

Assistant Professor, Data Science Dept.

RAJA APPUSWAMY, YOU ARE A NEW MEMBER OF THE DATA SCIENCE DEPARTMENT AT EURECOM. COULD YOU BRIEFLY DESCRIBE YOUR BACKGROUND?

I got my PhD in Computer Science in 2014 from the Vrije Universiteit (Free University) of Amsterdam in the Netherlands. I was lucky to have Prof. Andrew S. Tanenbaum as my advisor, since he is considered one of the forefathers of Operating Systems. He actually created MINIX, an open-source software similar to UNIX but with some specificities. It is based on a microkernel design, primarily developed for educational purposes and famous for not crashing! After my PhD - during which I designed a cutting-edge storage stack to improve MINIX storage features - I worked at Microsoft as a visiting researcher and as a Postdoc at EPFL, in Lausanne, where I started projects on data storage and analytics.

HOW DID YOU GET INTO THE DNA DATA STORAGE FIELD AND WHY?

As you know, we live in an era of data deluge. Companies keep on aggregating vast amounts of data with the objective of extracting actionable insights out of it. And with the Internet of Things, this trend will be even more exacerbated. But before data can be converted into useful information, it needs to be stored reliably, managed seamlessly and processed efficiently. DNA storage is one of the most interesting technologies that could help us do all of this. That is why I decided to work on this promising storage solution.

WHAT ARE THE MAIN ADVANTAGES OF DNA STORAGE? DOES IT REQUIRE SOME BACKGROUND IN BIOLOGY TO WORK IN THIS FIELD?

I forgot to mention that I actually got two Master's degrees from the University of Florida: Computer Engineering and Biological Engineering… That helps for sure! What makes DNA storage so powerful is its density and durability. You probably know that DNA is built from a double helix chain of four nucleotide bases - adenine, thymine, cytosine and guanine.

These chains fold tightly to form extremely dense, space-saving data storage. For example, while you can store 10 GB/mm3 on a hard disk, and even 100 GB/mm3 on tape, DNA can store 1 Exabyte/mm3!

Which means one billion gigabytes! Even if density of conventional storage tools increases every year, it's still not enough compared to data growth that increases by 60% per year.

There are also some issues regarding the reliability and durability of data. For example, preserving old movies is a major concern for Hollywood. Studies show that magnetic tapes can store data for 30 years and that hard disks average life span is about 5 years. You can always transfer movies from an old tape to a new tape every 30 years, but it is costly and takes time.

Since we know that fossilized bones can preserve genetic material for several thousands of years, it is easy to understand why DNA could revolutionize data storage!

WHAT ARE YOU WORKING ON EXACTLY AND HAVE YOU GOT SOME RESULTS ALREADY?

Yes! We've got some major results that we published and presented at the last Conference on Innovative Data Systems Research (CIDR) in California. It is actually a world first! We succeeded in encoding a 12 kB SQL database on DNA strands.

And we were even capable of doing some queries from this database – which means we could not only read the original data, but also directly manipulate DNA to perform computation. The database is formed of 400 DNA strands and weighs 103 nanograms…

For this project, I am working with scientists from CNRS in Sophia Antipolis and Imperial College in London, and we know that scaling up to a larger database will be difficult. That is why we are already working on a new project based on using DNA in blocks, like a regular hard disk. Our goal is to design a machine, not too expensive, that can automatically store data encoded in DNA on a DNA disk - just like hard disks we know today. The big challenge is actually the synthesis part of the process. Storing and sequencing data are relatively cheap but DNA synthesis is very costly.

DNA DATA STORAGE IS ONE BIG CHALLENGE, BUT BEING ABLE TO PERFORM BIG DATA ANALYTICS IS NOT EASY EITHER. YOU ARE DEVELOPING NEW WAYS OF SPEEDING UP CALCULATIONS, AREN'T YOU?

For our DNA storage project, we only use CPUs (Central Processing Units). But for big data, we will have to use GPUs (Graphics Processors Units) that are a lot quicker - thanks to their thousands of cores that can compute parallel calculations.

I am talking about mathematical operations that can take several months with a CPU… and only a few hours with a GPU. That is why I am working on improving the way we combine GPUs with CPUs. This combination works quite effectively in Business Intelligence. But Artificial Intelligence, especially Machine Learning, relies on complex statistical computations.

So I plan on designing new algorithms for GPUs and new methods for separating calculations between CPUs and GPUs.

ACCORDING TO PIETRO MICHIARDI, EURECOM DATA SCIENCE TEAM LEADER, YOUR ROLE WILL ALSO BE TO BRING A GLOBAL VIEW OF THE WHOLE BIG DATA "SYSTEM". ARE YOU READY FOR IT?

Actually, one of the reasons that motivated me to work at EURECOM is the variety of projects in Data Science. As you have understood, my research activities focus on building data management software that can effectively exploit modern hardware to reliably store and efficiently process data. That is why my work covers almost all layers of the hardware-software stack and spans many disciplines - including computer architecture, systems and networking, high-performance computing, programming languages, and data-intensive computing. This is the reason why I will work as much as I can with other EURECOM scientists on their projects – and I will try to have them collaborate with me on mine! This is the best way to have an impact on Big Data issues, which in turn will have a major impact on our society.

Added Expertise IN THE DATA SCIENCE DEPARTMENT eHealth

Maria Zuluaga, the Data Science Department's last recruit from Amadeus, will contribute to the advance of the department's research in AI applied to medicine.

>> Maria Zuluaga

Assistant Professor

Data Science Department

MARIA, YOU ARE ORIGINALLY FROM COLOMBIA BUT HAVE DONE ALL YOUR RESEARCH IN EUROPE. CAN YOU TELL US MORE ABOUT YOUR BACKGROUND?

It was during my master's degree in computer science in Colombia, at Los Andes University in Bogota, that I had my first contacts with France. The professor who supervised my work in medical imaging referred me to the Claude Bernard University, in Lyon, where I was able to do my doctorate in image processing starting in 2007. I then did a very interesting postdoc at the European Synchrotron Radiation Facility in Grenoble. After that, I was a researcher at UCL (University College London), where I stayed for four years. But it was destiny that I would return to France...

SO YOU CAME BACK TO FRANCE TO WORK AT AMADEUS?

Exactly. Amadeus was looking to structure its AI research team, and I was looking for a more industrial experience where my research could be applied. So, for two years I supervised a small exploratory research group at Amadeus. And I am very pleased to have been able to file a patent with two colleagues in the field of anomaly detection algorithms. It is a multi-criteria comparison methodology of algorithms used in artificial intelligence.

But when the opportunity to work at EURECOM presented itself, I seized it! I had already been working with Pietro Michiardi and Maurizio Filippone since 2018 through the supervision of a doctoral student. When the position of Assistant Professor opened up in the Data Science Department, I immediately

applied, and I got the job after a six-month selection process! I am very happy to be part of this wonderful team. I am delighted about everything: the research topics, the team members and EURECOM's connection with industry! EURECOM is the best of both worlds: fundamental research and applied research are equally valued.

YOU ARE A CO-AUTHOR OF A PATENT. YOU ARE ALSO A CO-AUTHOR OF SEVERAL DOZEN PUBLICATIONS AND SOFTWARE PROGRAMS, ONE OF WHICH IS USED BY A HOSPITAL. THIS IS VERY PROMISING FOR SUCH A YOUNG RESEARCHER! WHAT MAKES YOUR TOPICS SO SPECIFIC?

I am working on a machine learning topic that is not common. These are methods that can use data that is not completely "annotated", unlike more traditional machine learning techniques where all the data characteristics are known.

Basically, my research focuses on the development of reliable computer-based learning techniques that can be safely used in high-risk areas, such as health care. My work therefore relies on various disciplines: statistical learning, time series analysis, image processing and computer vision.

This helps us advance in the field of interactive machine learning, which is about strengthening software learning through user input, for example from physicians. I am very happy to have contributed to a tool now used by the St Thomas Hospital in London. The software is designed to help brain surgeons make the right decisions, especially in the field of epilepsy. The tool is dynamic, which means that continues to develop with each input provided by physicians.

WHY THIS INTEREST IN MEDICAL SCIENCES?

My whole family comes from the medical community. My parents are both doctors, and my sister is a dentist. That's an environment that I know very well and that interests me. I started working on medical applications during my master's degree and I haven't stopped since.

My goal is not to develop artificial intelligence software systems that will replace physicians, but to give them tools that will help them make more informed, relevant and fairer decisions.

My favorite areas are brain and heart surgery, two high-risk areas where decisions often have a vital impact. Hence the importance of evaluating the errors made by the machine and the degree of uncertainty of results.

The major difficulty in medicine is that data–often collected from probes and sensors connected to patients–are by definition heterogeneous, complex and difficult to use. This is why traditional machine learning techniques are not particularly suited. There is a need for methods based on interactivity and on the evaluation of the uncertainty of the results.

DOES THIS MEAN YOUR PROJECTS AT EURECOM WILL FOCUS ON UNCERTAINTY ASSESSMENT?

Yes. A large part of it anyway! The nature of my research is complementary to what is done in the Data Science Department. So I will continue to develop evaluation methods to build up the relevance of our tools and make them usable in the real world.

I will also teach, which I love doing: being in contact with students, transmitting, getting their feedback and so on. I will start this school year with a course on fundamental methods: Machine Learning & Intelligent Systems. I would also like to prepare a "Data Science for Health" course, based on the most relevant AI methods and specific health issues.

I am aware that I also have to look for funding for my projects. Even if I have little experience in this field, it doesn't scare me. I am still in contact with my early partners and this should help, particularly INRIA, the CREATIS laboratory in Lyon, and UCL in London.

THIS SHOULD DEVELOP EURECOM'S EXPERTISE IN AI APPLIED TO MEDICINE.

That's right. We have some great things to do at EURECOM in the field of interactive machine learning and error evaluation. These dynamic tools, which are improved through user feedback, have many applications: finance, for example, where decisions also have a major impact. But the application to medicine will remain an important part of my work. A doctor once told me, "The tool doesn't have to be perfect, I just need to know when it can fail." And I would add, when the result is not certain, the tool must be able to indicate its level of uncertainty. This has guided my work to date and will continue tomorrow.

Biometrics and Image Integ

FACIAL RECOGNITION AND IMAGES ARE OFTEN MISUSED TO SERVE DUBIOUS INTERESTS. THIS EXPLAINS THE IMPORTANCE OF NEW TOOLS TO MITIGATE RISKS AND OF A LEGAL FRAMEWORK THAT WOULD LIMIT EXCESSES.

Jean-Luc Dugelay

Professor,

Digital Security Department

JEAN-LUC DUGELAY, EURECOM'S EXPERT IN THIS AREA, GIVES US SOME CLUES

JEAN-LUC DUGELAY, WHY IS IT IMPORTANT TODAY TO WORK ON IMAGE INTEGRITY? ARE THE RISKS COMPOUNDED WHEN DEALING WITH IMAGES?

Taking pictures with a smartphone, while very effective, has now led to security issues. The quality of the image sensors and the convenience of the editing tools are improving constantly. I am convinced that the image manipulation phenomenon is going to broaden in scope. Insurance companies, for instance, increasingly resort

#

Protected Image

Image tampered

Detection of trafficked areas with partial reconstruction

rity

to photos to complement accident claims. But it's so easy today to edit a photo with a smartphone that we need tools capable of identify tampering.

DON'T WE ALREADY HAVE TOOLS FOR IMAGE ANALYSIS?

Yes, law enforcement agencies use partially automatic image verification software. But their use requires some expertise, and time. Today, we are overwhelmed with images and everything goes quicker. Anyone can edit, counterfeit or tamper with a photo without leaving a trace. And reframing and modifying colors are widely accepted. But changing the meaning of a photo can be unacceptable and punishable by law. Removing a person, changing a plate number or the light to make some believe that the picture was taken at a different hour are easy and harmful. This is compounded by the fact that images are now considered as pieces of information. They can become disinformation tools, as seen recently in some media and on television.

IS THIS WHY IT IS IMPORTANT TO DESIGN RELIABLE AND AUTOMATED TOOLS TO AUTHENTICATE IMAGES?

Exactly. This would lift any doubt about the veracity of a piece of information that has the potential of harming a person or an organization, misinforming, discrediting, or spreading propaganda. The DEFALS (Detection of forgeries in pictures) challenge, organized by the DGA (the arms branch of the French army) addresses the issue with four teams, each with three partners. EURECOM is in charge of developing the DEFACTO project which aimed to design tools to automatically detect any change to an original image and to assess its degree of confidence. Authentication of images is still in its infancy. While it is easy to produce a falsified picture which seems genuine, it is very difficult to detect alterations without the source.

YOU ARE ALSO A SPECIALIST OF ANOTHER FIELD PLAGUED BY ABUSES, NAMELY FACIAL RECOGNITION. CAN YOU EXPLAIN THIS?

Originally, biometrics–or facial recognition–was used in the security field to identify individuals, and video surveillance to control crowds. These two technologies have now merged: video surveillance has become a biometric system.

In other words, we can now identify the iris of a moving person in a crowd, even from several meters away. While a few years ago, biometric sensors only worked from less than a meter from a motionless person! This progress can be very beneficial, such as finding an abducted child in a crowd, for example. But this also raises social issues.

THESE ARE ETHICAL QUESTIONS, AREN'T THEY?

That's right. This is because biometrics is now used across civil society on a daily basis. In schools, airports, or to unlock your phone, why not if it's for security reasons.

But using biometrics to tailor ads to the age and gender of travelers can be seen as a drift from the original intent. The confusion lies in the fact that the technology is immediately usable by humans–i.e. recognizing a face–unlike fingerprints, for example, which we can't identify directly.

SO, THE TECHNOLOGY IS DEVELOPING FASTER THAN THE LAW?

Yes. Sensors improve constantly with an even greater resolution and new opportunities. We are working on plenoptic sensors that are equipped with several lenses so we have more information on the luminance. Thermal cameras that can provide us with a facial thermogram are also being developed. Biometric sensors already see better than the human eye and can estimate the age of a person better than us. And with the progress of artificial intelligence algorithms that are now able to analyze instantly huge amounts of data, we have a clear image of today's power of biometrics. Big Data and Machine Learning techniques have made it possible for facial recognition to be faster, more accurate and more effective.

THESE TECHNOLOGIES OF IMAGE EDITING AND FACIAL RECOGNITION ARE FULLY DEVELOPED. HOW CAN WE CONTROL THEIR ADVERSE EFFECTS?

The societal consequences of these technologies are difficult to control. While they were originally reserved to the narrow circles of the criminal world and security, these technologies are now highly accessible and widely used. Technology can help control their use in civil society-and limit their diversion, but there is a clear need for a legal framework with rules, obligations and penalties commensurate with each offense: fake news, identity theft, obligation to destroy personal data of people filmed after a period of time. The priority today is support these technical and algorithmic advances with ethical and legal procedures, and ensure that these advances are actually a benefit for society.

How 5G Will Change Our HABITS

A MAJOR PLAYER IN THE DEVELOPMENT OF 5G AND 6G, EURECOM IS AT THE HEART OF THE BEHAVIORAL CHANGES THEY WILL INDUCE. DAVID GESBERT, HEAD OF EURECOM'S COMMUNICATIONS SYSTEMS DEPARTMENT GIVES US A REVIEW OF THESE NEW TECHNOLOGIES.

DAVID GESBERT, 5G IS IMMINENT AND MAY PROFOUNDLY CHANGE OUR HABITS IN MOBILE COMMUNICATIONS, YET IT IS OFTEN CONSIDERED AS JUST AN INCREASE IN SPEED. CAN YOU EXPLAIN THIS?

5G is not faster than 4G. Today, the emphasis is about the responsiveness of the 5G system. In other words, depending on the applications and the conditions of the signal transmission, the responsiveness of 5G will help us improve several parameters at the same time: broadband, of course, but also reliability and latency (of the order of a millisecond). It is this very responsiveness which, for example, enables surgeons to operate remotely with a haptic glove (that simulates the force feedback), factory robots to be controlled remotely and in real time, or even an autonomous vehicle to be informed about a sudden obstacle before a collision.

An even more telling application made possible by the 5G technology is what we call the Internet of competences: for example, organizing a concert with musicians in different locations. A world premier was carried out in June 2018 by a research center of London's King's College with a London-based pianist and a singer in Berlin. Despite the distance, the low-latency 5G connection made possible a real concert, both visible and audible in London and Berlin!

FROM A TECHNOLOGICAL STANDPOINT, WHAT IS THE DIFFERENCE BETWEEN 5G AND 4G?

With 5G, throughput will be increased 10 to 100 fold compared to 4G, depending on usage, and latency will be reduced at least 10 times. But 5G can also use additional frequency bands, called millimetric waves (or extremely high frequencies), of 30 to 60GHz. These are larger bands that allow for a much higher throughput. However, because these frequency bands are more sensitive to obstacles, the signals can't travel as far as they would with the below 6GHz frequencies traditionally used in 4G. So they will be reserved to short-range applications, between vehicles for instance, or applications with no obstruction. Finally, with the Massive MIMO techniques, with their compact meshes of hundreds of combined antennas used in 5G, we can send data in a more directional way. In addition to reducing the energy needed, this improved directivity has one key advantage: the ability to support about 1,000 more mobile devices per square meter! All this demonstrates the flexibility of 5G compared to 4G, allowing to better adapt to the demands and needs in throughput, reliability and latency.

COULD YOU GIVE US EXAMPLES OF PROJECTS THAT COULD IMPACT OUR DAILY LIVES?

About the Internet of Things, 5G will enable us to standardize communication between them, implying more developments. For example, tests are underway to operate autonomous vehicles with a network of dedicated antennas installed on the roads. In this case, the 5G cellular network helps cars know their position and their speed at all times, and improve and secure their autonomy. It's a strategy of autonomy that is very different from the one used for Google

>>David GESBERT

Professor, Head
Communication Systems
Department

“IN ADDITION TO REDUCING THE ENERGY REQUIRED, THIS BETTER DIRECTIVITY HAS A MAJOR ADVANTAGE

cars which operate independently with a multitude of on-board sensors. The open source OpenAirInterface platform, co-launched by EURECOM, is being tested by China Mobile in collaboration with the Beijing University BUPT, a EURECOM partner, to ensure the connection of autonomous cars to the 5G network. So for many experts, autonomous cars can only be developed with 5G.

We are witnessing partnerships between telecommunication industrials and automakers to develop such vehicles on dedicated experimentation sites. In this particular case, 5G boasts several advantages: low cost because of fewer sensors, more reliability and security, and better traffic regulation through a supervision system.

DAVID, YOU ARE ALREADY WORKING ON 6G WHICH SHOULD PLAY A KEY ROLE IN ARTIFICIAL INTELLIGENCE. CAN YOU SHED SOME LIGHT ON THIS?

Although it is too early to tell what 6G will really be about, a key aspect of the development of beyond-5G systems will undoubtedly be the use of the popular Machine Learning tool. There is a growing number of publications on the topic in the mobile communications sphere, as well as in specialized journals and in conferences.
The expert researcher EURECOM is currently recruiting in this domain and will collaborate on several projects, notably Perfume, funded with an ERC grant for three years. The project aims to make better use of the computing and memory resources of any connected object, both at the level of objects and at the level of communication between them.
In other words, each signal will have its own intelligence, making it able to adapt to the demand based on the available network frequencies or power. Another use of Machine Learning planned in Perfume is the intelligent positioning of relay antennas. We have recently achieved a world premiere at EURECOM by deploying a stand-alone drone able to move in an optimized way to provide ground connectivity whenever and wherever it is most needed.

Compared this to Google’s hot air balloons deployed in 2017 in Puerto Rico following Hurricane Maria to restore the Internet and mobile lines, the use of drones for such critical situations would clearly be more efficient: more autonomy, more speed, and most of all, more throughput. We are dealing here with several megabytes per second while the transmission of Google’s hot air balloons are in kilobytes per second and must weather winds.

IS EURECOM INVOLVED IN OTHER PROJECTS AIMING TO TRANSFORM OUR DAILY LIVES?

Yes. EURECOM is a partner in two European projects with a Marie Curie grant (known to be highly selective, with a success rate below 4%). These two projects spread over a period of three years are designed to develop new signal processing techniques for the after-5G. Multiple partners joined the Spotlight project started in 2017, including Ericsson, the University of Athens, and NEC. For Windmill, we work with about 15 partners, including Nokia and the Danish University of Aalborg.

Our goal is to use the latest machine learning techniques to improve the automation of resource allocation within mobile networks. We are very proud to collaborate on this project. First, as I said, it’s not only a Marie Curie project which, by definition, aims to train the new generation of researchers, but also the only European telecommunications project to date focusing on machine learning in 6G.
And its results will surely have a tremendous impact on how humans interact with mobile devices.

#5G

Raymond Knopp, leading player of the OpenAirInterface testing platform for mobile applications, welcomes EURECOM's growing role in the development of 5G as it will undoubtedly revolutionize our economies.

>> Raymond Knopp

Professor, Communication Systems Department
President of the OpenAirInterface [OSA] Alliance

EURECOM & THE 5G REVOLUTION

FOR USERS, THE STANDARDS OF MOBILE COMMUNICATIONS, 3G, 4G, AND 5G SEEM ALIKE. WHAT IS YOUR EXPERT OPINION?

Actually, they are completely different! From a user standpoint, the evolution may seem progressive but there is a real technological break between each generation which leads to more and more applications. The 2G-3G and 3G-4G transitions were a milestone from a technical standpoint.
It will be the same with the 4G and 5G which should include millimetric waves that can offer a larger broadband. We see incredible experiences with 5G, such as remotely-assisted robotics, but its impact will go well beyond.

In fact, telecommunications carriers want to use the 5G reduced latency time to attract industries that are currently not big users of mobile networks. The examples are many: the agricultural industry, electricity providers (such as EDF), or public administrations.

The second phase of 5G will imply a real break and is likely to revolutionize the telecommunications industry but also the economy at large. It is precisely on this second phase that EURECOM is working now, particularly through our OpenAirInterface (OAI) platform.

WHAT ARE THE INDUSTRIES THAT COULD BENEFIT FROM 5G TO THE POINT OF CHANGING THEIR OPERATIONS?

The first applications that come to mind are 'smart agriculture', aquaculture, and security. In agriculture, 5G will optimize the use of equipment with sensors or autonomous vehicles for example. Farm machinery equipment with 5G is beginning to emerge. Aquaculture is also very suitable to optimization with 5G.

At EURECOM, we are investigating opportunities to work with companies in the Côte d'Azur to improve fisheries or oyster parks. We are installing terminals at sea and on land and underwater sensors to better monitor the development of the parks. As for security, in many countries the police use proprietary systems for reliability and confidentiality issues.

So agents often use two mobile devices, a professional one and a personal one. With 5G, we can imagine a complete integration of all professional devices with the personal systems and extending this to other industries, such as electricity providers or rail transportation systems.

HOW WILL TELECOMMUNICATIONS OPERATORS HANDLE THIS?

They might divide the communication channels in multiple flows, like American carriers who can monetize the flows of major content providers by ensuring them a greater broadband since the United States abandoned net neutrality in June 2018.
Until now, we had the voice on one side and data on the other. Tomorrow, traffic will be much more diverse and we must prepare 5G to manage this content diversity by giving it more flexibility. This requires a different architecture.

IS IT THEREFORE A PURELY TECHNICAL ISSUE?

No, this is not just a question of technology. One of our challenges is to be able to manage several flows. But operators must find ways to manage this. And when I speak about operators, it is not necessarily traditional carriers, but also key players such as Amazon, Google, or Facebook, which have the tools to quickly penetrate the telecommunication world. In the end, 5G may not only change the face of many industries, but also the telecommunications industry which will need to reorganize.

WHAT ARE SOME EURECOM PROJECTS THAT MAY CONTRIBUTE TO THESE CHANGES?

EURECOM has a major role in two of the three European 5G PPP (public-private partnership) projects selected in the summer of 2018. Their role is to deploy 5G research platforms for the future infrastructures of operators. Each of these two projects, 5G-EVE and 5GENESIS, includes about 30 partners and is funded up to 20M€.
The 5G-EVE project involves major companies such as Orange, Telecom Italia, Telefonica, Ericsson, or Nokia. The French are actively involved through Orange, which is developing a commercial strategy with Nokia, and through a research program dedicated to infrastructure with the b<>com Institute in Rennes and EURECOM's OAI platform.

EURECOM will bring its expertise in terminals with OAI to the 5GENESIS project, which brings together small and medium-sized companies from the South of Europe.

We are also involved in Empower, another European project funded as a coordination and support action by the Horizon 2020 program. Along with Nokia, Interdigital, and Telenor, our goal is to share our knowledge on "5G and beyond", to promote Open source in mobile communications, and to harmonize the development of future standards with the United States. We are also preparing other projects for 2019, particularly with end-users operating in the sectors of intelligent agriculture or smart electrical networks.

ISN'T THE OAI PLATFORM CONTRIBUTING TO EURECOM'S GROWING INVOLVEMENT IN THE FUTURE OF MOBILE COMMUNICATIONS?

In large part, yes! OAI is central to all our projects. It is EURECOM's flagship in the development of building blocks for mobile communication standards.
For the 5G-EVE and 5GENESIS projects, some OAI partners, such as China Mobile, RedHat, or Fujitsu, could use some OAI building blocks if the quality is of industrial grade. We all have something to gain from this!

This represents a huge challenge for OAI, which may be at a historical turning point. Our goal is to operate 5G terminals and infrastructures in open source via OAI within the same time-frame as industrials. We're almost there! This is even acknowledged by the community managing the future standards of wireless communications.

WHAT DO YOU MEAN EXACTLY?

The role of EURECOM within 3GPP–the global entity that publishes the technical specifications for mobile networks–will become more active starting in 2019, and we will be directly involved in the process of the standardization of 5G and beyond. This will be done in collaboration with and funding from Qualcomm, and we will use OAI to propose our ideas that could turn into patents. Our participation in 3GPP will also mean training doctoral students to the reality of industries, as their work will aim to be integrated into the standard. Overall, this is a consecration for OpenAirInterface, and we must rise to the challenges that lie ahead.

Thesis

THEY HAVE SUCCESSFULLY DEFENDED THEIR THESIS

DIGITAL SECURITY

Cédric VAN ROMPAY

Multi-user searchable encryption

Thesis advisor:
Refik MOLVA & Melek ÖNEN
October 4th, 2018

Natacha RUCHAUD

Privacy protection, preserving the utility of the visual surveillance

Thesis advisor:
Jean-Luc DUGELAY
February 16th, 2018

Florian LUGOUD

Environments for analyzing the security of smart objects

Thesis advisor:
Ludovic APVRILLE & Aurélien FRANCILLON
February 8th, 2018

Julien KEUFFER

Verifiable Computation and Biometric Authentication

Thesis advisor: Refik MOLVA
February 25th, 2019

Giacomo VALENTI

Secure, efficient automatic speaker verification for embedded applications

Thesis advisor: Nicholas EVANS
March 4th, 2019

Valeria CHIESA

Revisiting face processing with light field images

Thesis advisor: Jean-Luc DUGELAY
June 4th, 2019

Athanasios ANDREOU

Auditing, Measuring, and Bringing Transparency to Social Media Advertising Ecosystems

Thesis advisor: Patrick LOISEAU
June 17th, 2019

Dimitrios VASILOPOULOS

Reconciling cloud storage functionalities with security : Proofs of Storage with data reliability and secure deduplication

Thesis advisor: Melek ÖNEN
July 23th, 2019

COMMUNICATION SYSTEMS

Kalyana GOPALA

Multiple antenna communications for 5G

Thesis advisor:
Dirk SLOCK
December 7th, 2018

Raj Haresh PATEL

Autonomous cars' coordination among legacy vehicles applied to safe braking

Thesis advisor: Jérôme HÄRRI
December 3rd, 2018

Sosina Mengistu GASHAW

Modeling heterogeneous vehicular traffic for intelligent transport system applications

Thesis advisor:
Jérôme HÄRRI & Paola GOATIN (INRIA)
November 30th, 2018

Chia-yu CHANG

Cloudification and slicing in 5G radio access network

Thesis advisor:
Navid NIKAEIN
November 29th, 2018

Konstantinos ALEXANDRIS

Mobility management and resource allocation towards 5G radio access networks (RANs)

Thesis advisor:
Navid NIKAEIN
March 9th, 2018

Wassim TABIKH

Massive MIMO in 5G networks for intercell interference cancellation and capacity boost

Thesis advisor:
Dirk SLOCK & Yi YUAN-WU (Orange)
February 26th, 2018

Gia minh HOANG

Cooperative multisensor localization for connected vehicles

Thesis advisor:
Jérôme HÄRRI & Dirk SLOCK & Benoît DENIS (CEA-Leti) February 19th, 2018

Maciej BIELSKI

Novel memory and I/O virtualization techniques for next generation data-centers based on disaggregated hardware*

Thesis advisor: Renaud PACALET
18th March 2019

Kim-Hung LE

Interoperation mechanism for industrial internet of things application and smart city

Thesis advisor: Christian BONNET
April 1st, 2019

Sumit KUMAR

Architecture for Simultaneous Multi-Standard Software Defined Radio Receiver

Thesis advisor: Florian KALTENBERGER
April 12th, 2019

Nikolaos LIAKOPOULOS

Machine Learning Techniques for Online Resource Allocation in Wireless Networks

Thesis advisor: Navid NIKAEIN
July 8th, 2019

Eleftherios LAMPIRIS

The high Dimensionality factor of Coded Caching: Resolving Bottlenecks one Antenna at a time

Thesis advisor: Petros ELIA
August 30th, 2019

DATA SCIENCE

Julien PLU

Knowledge extraction in web media : At the frontier of NLP, machine learning and semantics

Thesis advisor:
Raphaël TRONCY & Giuseppe RIZZO
December 21th, 2018

Emilie PALAGI

Evaluating exploratory search engines: designing a set of user-centered methods based on a modeling of the exploratory search process

Thesis advisor:
Raphaël TRONCY, Fabien GANDON & Alain GIBOIN (INRIA)
Novrmber 23th, 2018

Thibault DEBATTY

Design and analysis of distributed k-nearest neighbors graph algorithms

Thesis advisor:
Pietro MICHIARDI & Wim MEES (École Royale Militaire, Bruxelles – Belgique)
October 5th, 2018

Francesco PACE

Mechanisms for efficient and responsive distributed applications in compute clusters

Thesis advisor:
Pietro MICHIARDI June 18th, 2018

Rémi DOMINGUES

Probabilistic Modeling for Novelty Detection with Applications to Fraud Identification

Thesis advisor: Maurizio FILIPPONE & Pietro MICHIARDI
January 29th, 2019

Kurt CUTAJAR

Architecture for Simultaneous Multi-Standard Software Defined Radio Receiver

Thesis advisor: Maurizio FILIPPONE
April 24th, 2019

HDR

Aurélien FRANCILLON

Security of connected embedded devices: software, hardware and wireless November 20th, 2018

Paolo PAPOTTI

Declarative rule discovery for detecting and correcting inconsistencies in noisy data. April 11th, 2019

Paul De KERRET

Team Decision Problems in Wireless Communications

July 2nd, 2019

AWARDS & HONORS

DIGITAL SECURITY

The team composed of Jose Patino, Héctor Delgado, Nicholas Evans and their co-authors of the LIMSI, have reached the podium three times for the Albayzin Evaluation: IberSpeech-RTVE 2018 Challenge; The ALBAYZIN assessment focuses on the multimedia analysis of the content of television programs provided by the Spanish Society of Spanish Radio and Television:

- **"Open-set diarization challenge" - 1st place**
- **"Close-set diarization challenge" - 2nd place**
- **"Multimodal diarization challenge" - 1st place**

This is the second time this team has won, since they already won the Albayzin 2016!

Khawla Mallat and Jean-Luc Dugelay received a **Best Poster Award** during the BIOSIG 2018 conference for their paper entitled "Multi-variation visible and thermal face database for cross-spectrum face recognition".

Marc Dacier has received a **"RAID Outstanding Service Award"** for his 20 years of leadership and commitment, fundamental to the creation and success of the conference. RAID 2018 (21st International Symposium on Research on Attacks, Intrusions and Defenses, 10-12 September 2018, Heraklion, Greece)

The "Fellow" distinction of IAPR (International Association for Pattern Recognition) was awarded to Jean-Luc DUGELAY in March 2018.

Congratulations to Beyza Bozdemir, Melek Önen and Orhan Ermis who obtained a Best Poster Award for their paper entitled "Privacy preserving neural network classification: A hybrid solution" obtained during the Workshop PUT 2019 (Open Day for Privacy, Usability and Transparency), co-hosted with the 19th "Privacy Enhancing Technologies Symposium" which took place in Stockholm on July 15, 2019.

TELECOM ParisTech Thesis Award 2018: 1st prize, Grigory Antipov: Deep learning for the semantic description of human visual traits.

DATA SCIENCE

Olfa Ben Ahmed and Benoit Huet won the **Best Paper Award** at CBMI 2018 (International Conference on Content-Based Multimedia Indexing, 4-6 September 2018, La Rochelle, France) for their work on Deep Multimodal Characteristics for Gender of film and the prediction of interest "!

Paolo Papotti received the **Distinguished Reviewer Award** at VLDB 2018 (44th International Conference on Very Large Databases, August 27-31, Rio de Janeiro, Brazil). Paolo Papotti was honored for his fair, timely and informative criticism and for his constructive and effective involvement in the discussion of papers!

Enrico Palumbo and Raphael Troncy received a **Best Poster Award** for their paper "Knowledge graph embeddings with node2vec for item recommendation" at the 15th European Semantic Web Conference (ESWC 2018, 3-7 June 2018, Heraklion, Greece).

 # EXCELLENCY REWARDED

COMMUNICATION SYSTEMS

Christo Kurisummoottil Thomas and Dirk Slock received a **Best Student Paper Award** for their article "Deterministic annealing for hybrid beamforming design in multi-cell MU-MIMO systems" during the SPAWC 2018 conference (Kalamata, Greece).

Soumya Kanti Datta was raised to the rank of **"Senior Member of the IEEE"** in August 2018.

Irfan Khan and Jérôme Härri received the **Best Poster Award** (3rd prize) for their paper: "Integration Challenges of Facilities-Layer DCC for Heterogeneous V2X Services" during the IEEE Intelligent Vehicle Symposium (IV) in Changshu, China.

Raj Patel, Jérôme Härri and Christian Bonnet won a **Best Poster Award** for their paper "Accounting for localization errors in a mixed-vehicle centralized control system" at the MFTS 2018 (2nd Symposium on Management of Future Motorway and Urban Traffic Systems), which was held in Ispra, Italy.

The CNFRS URSI-France 2018 medal was awarded to Dirk Slock, under the aegis of the Academy of Sciences, for his work in radio sciences.

On March 23, 2018, EURECOM was twice rewarded with a **TELECOM ParisTech 2018 thesis prize**:

- **1st prize:** Grigory Antipov: Deep learning for the semantic description of human visual traits
- **3rd prize:** Jingjing Zhang: The interaction between caching, feedback and topology in the wireless broadcast channel.

Congratulations to Placido Mursia, Italo Atzeni and David Gesbert of the Communication Systems Dept., who received a Best Paper Award, during the ICC 2019 Conference, for their paper entitled "D2D-Aided Multi-Antenna Multicasting".

They received their prize on May 23rd, during the "Keynote Session" held in Shanghai, China.

EURECOM

Sophia Antipolis

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