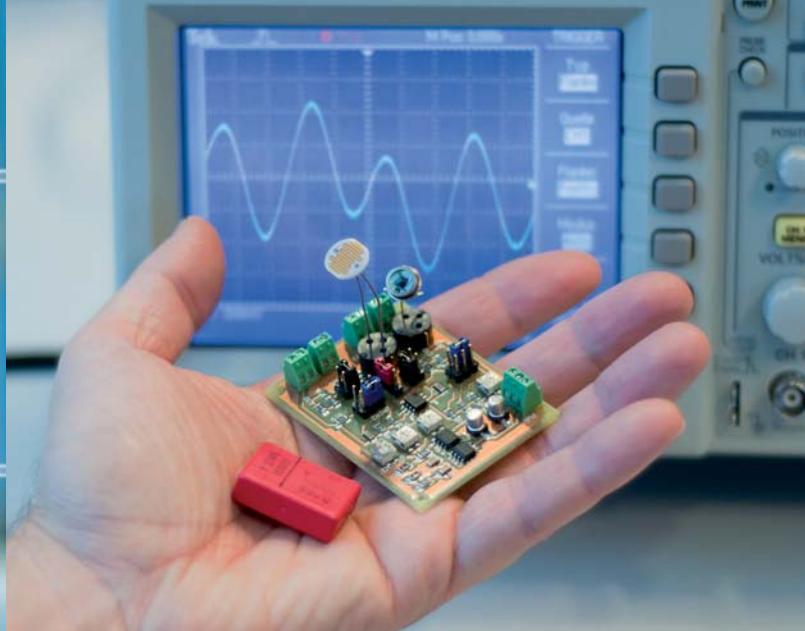
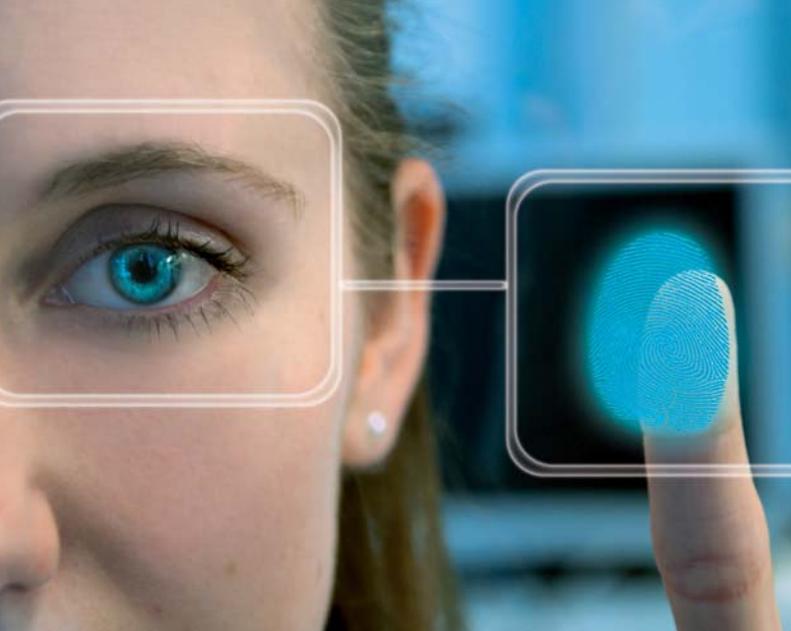


Master

Applied Image and Signal Processing

Fulltime / Joint Master Programme





MASTER PROGRAMME

Imagine the Possibilities ...

Image and signal processing affect our daily lives in an ever-increasing way. Participate in designing this fascinating technology and shape IT's future function in business and society.

Today's networked devices for image and signal generation provide a historically unmatched volume of raw data for automated decision making and control systems. The demands are high: How can we design new tools and software in order to best distil useful information?

A lot of interesting research and development projects in the private and the public sectors are calling for your expertise. Alternatively, this degree will open career tracks in universities and research labs.

The international Joint Degree Master Programme „Applied Image and Signal Processing“ is conducted in English. The standard period of study is four semesters. The full program is worth a total of 120 points according to the ECTS (European Credit Transfer and Accumulation System). The academic degree of „Master of Science in Engineering“ (MSc) will be awarded upon successful completion of the programme.

From Theory to Practice

The first semester is devoted to a concise study of the theoretical basis, the mathematical models and the algorithms used in image and signal processing. The second semester additionally focuses on geometric modelling, audio processing and digital media formats. Starting with the third semester, specific application scenarios are discussed and corresponding technologies are investigated in a number of elective courses.

Choose your Elective Courses

Choose one compulsory elective course from each University (see list and description on next page) and additionally define your free electives with a total sum of 6 ECTS. While it is recommended to take a third elective course as your free elective, any lecture held in English on any of the two Universities qualifies as free elective.

Apply your Scientific Knowledge

In the third semester, students also start research on their master thesis and acquire profound IT-project management skills. The fourth semester is dedicated to the completion of the master thesis. An accompanying master seminar provides a forum for presenting and defending one's approach to a solution and the results obtained, i.e., for scientific discourse with faculty and peers.

Modules & Competences

This Joint Degree Master Programme is designed to provide students with an in-depth professional and scientific training. Based on appropriate prior bachelor studies, this programme offers a thorough technical training in conjunction with research-driven teaching. It will make the participants familiar with introductory and advanced-level topics in the fields of image and signal processing, their formal and methodical basics, and with diverse fields of application. The sound knowledge and skills acquired in this programme qualify the alumni for diverse practical challenges in their professional work and empower them to contribute to future innovations in image and signal processing. A master thesis serves as a documentary proof of the student's ability to tackle scientific problems successfully on his or her own and to come up with a result that is correct with regards to contents and methodology. Thus, this programme also paves the road to subsequent work in science and technology.



ELECTIVE COURSES

(will partly be held in alternating years only)

Salzburg University of Applied Sciences

Medical Imaging

Image and signal processing applications in medicine are optimized with respect to the numerous modalities and sensors used. Images need to be segmented, co-registered and processed with respect to contextual knowledge. Students get to know the most popular tools and libraries, and acquire competences in designing solutions for tomorrow's medical technology.

Platform Specific Signal Processing

Modern architectures for processing images and signals require tailored implementations of algorithmic concepts which exploit the functional framework of the hardware environment and achieve the best possible performance. Students study concepts like fixed point formats, parallelization and hardware description languages and become experts in designing applications on dedicated hardware.

Data Science

Students get known to technical and organizational challenges imposed by big data applications and understand methods and algorithms for data-intensive software development. They are aware of the interdisciplinary aspects of big data engineering and have a basic command of established frameworks. As to particular methodology, general linear and nonlinear regression models will be examined in more detail and students will develop the ability to independently apply those techniques and to appreciate the underlying mathematical concepts.

Paris Lodron University of Salzburg

Biometric Systems

Students study biometric technologies and learn the most common modalities for the identification of individuals. Implications on security and privacy are discussed. Biometry is a generic topic in that various methods and concepts can be found in many other areas of image and signal processing as well, and in that the optimization of systems with respect to risk minimization is of a general nature.

Media Security

Concepts for encryption, authentication and robust labelling of multimedia data are presented and their application in media forensics is discussed. Since different modalities require highly specialized methods, students will become experts in a range of such algorithms and will be able to design applications that achieve a good compromise between robustness, speed and usability.

Computational Geometry

Computational geometry is the study of the design and analysis of efficient algorithms for solving problems with a geometric flavor. The methodologies of computational geometry allow one to investigate solutions of numerous geometric problems that arise in application areas such as image processing, computer-aided design, manufacturing, geographic information systems, robotics and graphics. This course offers an introduction to computational geometry: We will discuss geometric searching, convex hulls, Voronoi diagrams, straight skeletons, triangulations, and robustness issues.

Machine Learning

Machine learning is the study of how to program computers to „learn“ from available input data. In other words, it is the process of converting experience in the form of training data into expertise to solve a variety of different tasks. Fundamental concepts such as probably approximately correct (PAC) learning, Vapnik–Chervonenkis theory and applications thereof are considered and applied in the analysis of popular learning algorithms such as Boosting or support vector machines.

THE CURRICULUM MASTER

Courses		1	2	3	4
Image and Signal Processing	Digital Signal Processing 1	6(4)			
	Signals and Systems 1	2(2)			
	Image Processing and Imaging	4(3)			
	Hardware oriented Signal Processing	3(2)			
	Geometric Modelling	5(3)			
	Digital Signal Processing 2		6(4)		
	Signals and Systems 2		2(2)		
	Audio Processing		5(3)		
	Media Data Formats		4(3)		
	Computer Vision			5(3)	
Mathematic Modelling	Selected Topics in Mathematics and Modelling	3(2)			
	Advanced Mathematics for Computer Science	7(5)			
	Applied Statistics		3(2)		
	Filterbanks and Wavelets		5(3)		
Data Analysis and Knowledge Discovery	Pattern Recognition			5(4)	
	Data Mining			2,5(2)	
Free Electives	Select from qualified SUAS and PLUS lectures		5	1	
Implementation and Application <small>(minimum is one elective course from each University, SUAS^1 and PLUS^2)</small>	Elective Course SUAS ¹ 1: Medical Imaging			5(3)	
	Elective Course SUAS ¹ 2: Platform Specific Signal Processing			5(3)	
	Elective Course SUAS ¹ 3: Data Science			5(3)	
	Elective Course PLUS ² 1: Biometric Systems			5(3)	
	Elective Course PLUS ² 2: Media Security			5(3)	
	Elective Course PLUS ² 3: Computational Geometry			5(3)	
	Elective Course PLUS ² 4: Machine Learning			5(3)	
Applied Sciences and Methods	IT-Project Management and Softwareprojects			3,5(2)	
	Master Seminar 1			3(2)	
	Master Seminar 2				2(1)
	Master Thesis				28(-)
ECTS (CHW)		30(21)	30(20)	30(19)	30(1)

Study Locations

Salzburg University of Applied Sciences (SUAS)

Department of Information Technology & Systems Management
Urstein Süd 1, 5412 Puch / Salzburg
Austria

Paris Lodron University of Salzburg (PLUS)

Department of Computer Science
Jakob-Haringerstr. 2, 5020 Salzburg
Austria

ECTS = European Credit Transfer and Accumulation System

CHW = contact hours per week per semester

The shown curriculum is an overview.

The detailed course outline can be found at: www.aisp-salzburg.ac.at

Academic Programme Directors:

FH-Prof. Univ. Doz. Dr. Stefan Wegenkittl

Salzburg University of Applied Sciences

Univ. Prof. Dr. Andreas Uhl

Paris Lodron University of Salzburg

"A lot of ongoing R&D projects require the analysis of images and signals by means of state-of-the-art algorithms and methods. This results in an ever increasing demand for highly skilled engineers. This new joint master programme provides our students with a higher degree of specialization, allowing them to take advantage of a lot of career options and interesting job offers. Our alumni will be able to design and implement the next generation of image-guided intelligent systems."





APPLICATION & ADMISSION

Study mode:

Fulltime

Length of study:

4 semesters

Degree awarded:

Master of Science in Engineering (MSc)

Study places per year:

20

Location:

Salzburg University of Applied Sciences
Paris Lodron University of Salzburg

Tuition and fees:

at least 380 Euro/semester (EU students)
up to double amount for other countries
of origin

Academic Programme Directors:

FH-Prof. Univ. Doz. Dr. Stefan Wegenkittl,
Salzburg University of Applied Sciences

Univ. Prof. Dr. Andreas Uhl,
Paris Lodron University of Salzburg

REQUIREMENTS FOR ENROLLMENT

Admission to this programme requires an adequate academic background, as provided by relevant bachelor programmes in the fields of engineering, computer science or mathematics offered by recognized national or foreign post-secondary educational institutions, such as bachelor programmes in computer science, computer engineering, mathematics, mechatronics, mechanical engineering, electrical engineering, automation engineering, or digital media science.

In particular, the core subject fields computer science and mathematics need to be covered by semester-long courses with a minimum number of 18 and 12 ECTS credit points or 12 and 9 contact hours per week, respectively.

APPLICATION PROCEDURE

- 1 Check necessary documents and deadlines on www.aisp-salzburg.ac.at
- 2 Complete your online application at www.aisp-salzburg.ac.at/online-application
The application procedure is managed by the Salzburg University of Applied Sciences on behalf of both institutions.

International Students: Get your documents legalized before scanning and uploading them and be sure to send those documents (original+legalization) by ordinary mail as well. Your documents need to be received before the application deadline.

› Dates and deadlines can be found on our website

- 3 Personal interview

FURTHER INFORMATION

- › www.aisp-salzburg.ac.at
- › www.fh-salzburg.ac.at/ais

CONTACT

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Salzburg University of Applied Sciences
Urstein Süd 1, 5412 Puch/Salzburg, Austria
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E office.ais@fh-salzburg.ac.at

Pictures inside:
Fachhochschule Salzburg

Front Picture:
Florian Hechenberger

Salzburg University of Applied Sciences is an institution of:





STUDYING IN SALZBURG

Salzburg University of Applied Sciences Paris Lodron University of Salzburg

Knowledge requires nourishment! We offer an up-to-date curriculum which we constantly adapt to the challenges of economy and society. Experienced and qualified faculty drawn from both academia and industry guarantee a cutting-edge education and provide impetus for scientific and academic content. Combined with state-of-the-art equipment in our auditoriums and labs, this stimulating environment creates the optimal breeding ground for growing your knowledge.

The Salzburg University of Applied Sciences and the Paris Lodron University of Salzburg have joined forces to offer this international joint master programme. This programme will allow you to get to know two different academic cultures, meet people with different backgrounds and learn to communicate professionally in an international working environment.

Knowledge needs inspiration! Both of our locations – Urstein Campus, where the University of Applied Sciences is situated and the Techno-Z Campus of the Paris Lodron University of Salzburg – are situated in one of the most beautiful areas in the world. Whether you are an art enthusiast, a music fan, a history buff or passionate about architecture: in Salzburg, historic heritage and tradition merge with modern lifestyle. The world meets up in Salzburg!

Urstein Campus

The courses of the University of Applied Sciences Salzburg take place at the Urstein Campus in Puch, which is close to downtown Salzburg. The attractive building complex was completed in 2005 in lushly green surroundings and in close proximity to the baroque Schloss Urstein and the medieval Meierei. The modern building with its architecturally striking „head“, which houses the library, provides an ideal setting for your studies. A station of Salzburg's rapid-transit railway is located directly at the campus, from where you can reach Salzburg's city centre within a few minutes.

Techno-Z Campus

The courses offered by the Paris Lodron University of Salzburg (PLUS) take place in the modern building of the PLUS Department of Computer Sciences at the Techno-Z Campus in Salzburg/Itzling. In addition to the CS Department of PLUS, the Techno-Z Campus houses high-tech firms, institutes of higher education and a residence hall for students. Downtown Salzburg is reachable within 10 minutes by bus, allowing students to explore the marvelous Old Town of Salzburg, which is a World Heritage Site. Similarly, one can get from the Techno-Z Campus to the main train and bus stations of Salzburg on foot or by bus within a few minutes.

Housing & Studying

Students who would like to combine study with housing are welcome to check out the hall of residence of the Urstein Campus at Puch (www.studentenheim.at) or the Techno-Z Campus (www.techno-z.at) at Salzburg. Information about grants, legal and practical issues is provided by www.oead.at.

Sports & Nature

Our sports departments offer diverse programmes of courses and training every semester. As a student of University of Applied Sciences Salzburg and the Paris Lodron University of Salzburg, you can use the facilities of the University and County Sports Centre Salzburg/Rif. Alternatively, you can simply explore nature outside your front door; the options are unlimited. No matter whether you are into skiing, snowboarding or ski mountaineering in winter, or beach volleyball, swimming, sailing or rock climbing in summer: Salzburg's mountains and lakes are available in closest proximity.

