

Data Science, Signal and Image Processing

INTEGRATED MASTER-PHD TRACK
CONTROL AND ROBOTICS

Centrale Nantes offers **high-potential students** the opportunity to join our 'two plus three'-year Integrated Master-PhD Track, fully taught in English for a cohort of international students. This track **draws on the areas of excellence of our research institutes and our existing MSc programmes** to bring together two years of Master's studies and three years at PhD level.

The Data Science, Signal and Image Processing Integrated Master-PhD track provides the necessary skills in signal modelling, image processing and machine learning. These skills are pertinent to both the theoretical foundations and practical applications of data analysis and information retrieval, essential for the development of cutting-edge numerical methods. This approach takes into account the unique physical characteristics of the data, ensuring the numerical implementation aligns with the specific application context, data volume, and available computational resources.

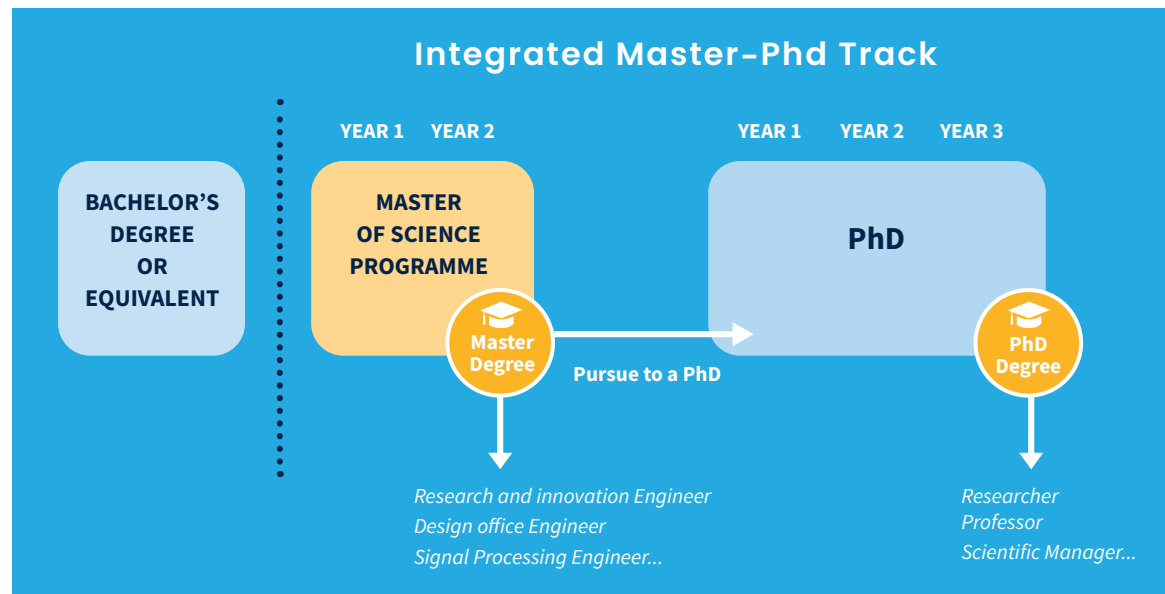
Why choose this track?

- Well-respected scientific expertise of the Laboratory of Digital Sciences of Nantes (LS2N)
- Reinforced research activities right from year one: research projects, access to research facilities with practical work in the unique experimental test facilities
- Close supervision and mentoring by a member of faculty
- Internship and research mobility opportunities thanks to our partner institutions and firms around the world

Skills

Master

- Establish a relevant statistical model for data representation and analysis
- Propose a methodological solution and its numerical implementation suited to the application context
- Have a solid background on real-life applications of signal and image processing in research and innovation
- Identify models, perform simulations and analyze results
- Undertake a literature survey of existing works on a scientific problem
- Communicate comprehensive results in a meaningful way
- Manage and supervise research and innovation projects.



OUR PROGRAMME

Master 1&2 (120 ECTS)

M1 - Semester 1

- ✓ Algorithmics and programming
- ✓ Artificial Intelligence
- ✓ Classical Linear Control
- ✓ Mathematical Tools for Signals and Systems
- ✓ Embedded Computing
- ✓ Signal Processing
- ✓ Language courses

M1 - Semester 2

- ✓ Research project
- ✓ Computer Vision
- ✓ Image Processing
- ✓ Optimization Techniques
- ✓ Systems Identification and Signal Filtering
- ✓ Spectral and Time Frequency Analysis
- ✓ Language courses

M2 - Semester 1

- ✓ Advanced Research project
 - ✓ Language courses
- Elective courses (choose 5 out of 6)**
- ✓ Biomedical signals, images and methods
 - ✓ Design of signal and image representations
 - ✓ Machine learning, data analysis and information retrieval
 - ✓ Mathematical tools for signal and image processing
 - ✓ Signal and image restoration, inversion methods
 - ✓ Stochastic methods

Students start in the Master's programme in Advanced Robotics and may join the Master-PhD track after the first semester. From the second semester of M1, the focus shifts to research.

NB: course content may be subject to minor changes

The last semester of the master's programme is set aside for the master's thesis

What sets our PhD track apart

- ✓ Tailored training opportunities — Gain exclusive access to specialist workshops and courses designed to enrich your doctoral journey.
- ✓ Financial support for international mobility — Dedicated funding to help you attend conferences, collaborate abroad, and broaden your academic horizons.
- ✓ A dedicated point of contact — Benefit from close guidance from a programme lecturer, complementing the support of your thesis supervisors.
- ✓ A say in programme life — PhD students can propose and co-organise events with faculty and administrative staff.
- ✓ A mentoring role — PhD students have the opportunity to guide and support Master's students throughout their studies
- ✓ And joining LS2N means more than pursuing a PhD — it is a chance to build a strong academic profile, grow your professional network, and open doors in both academia and industry.

Career Opportunities

Sectors

Health, Communication, Instrumentation technologies, Computer science, Research and development.

Fields

Artificial Intelligence and Machine Learning, Data Science and Analytics, Signal and Image Processing, Computer Vision, Biomedical Engineering and Medical Imaging, Embedded and Edge AI, Robotics and Autonomous Systems.



Admission Master Level Academic requirements

- Applicants must hold a Bachelor's degree or equivalent (180 ECTS) in Engineering, Science or Technology and have a good level in Mathematics.

Language requirements

- At master's level: Written and spoken fluency in English is required. Applicants whose native language is not English must submit a certificate for a recognised international test of English (minimum score to achieve: TOEFL - IBT 80, or ITP 550, Cambridge B2 First Test 173, Cambridge C1 Advanced Test - 160, IELTS - 6.5 or TOEIC - 800).

REINVENT ENGINEERING



Contact

Programme coordinator

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