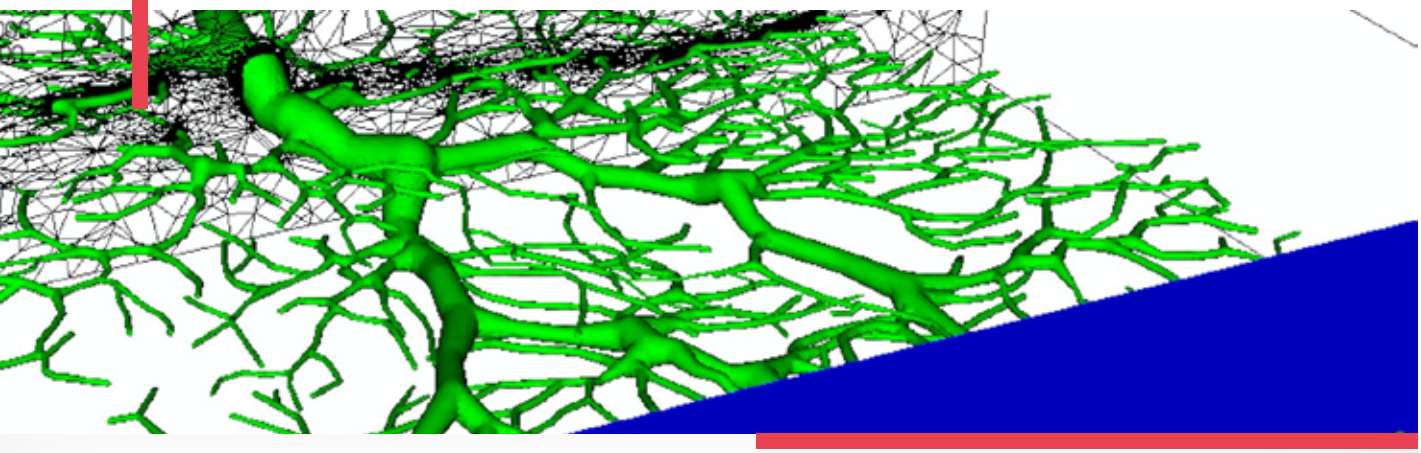
SHAKE THE FUTURE.

CENTRALE NANTES



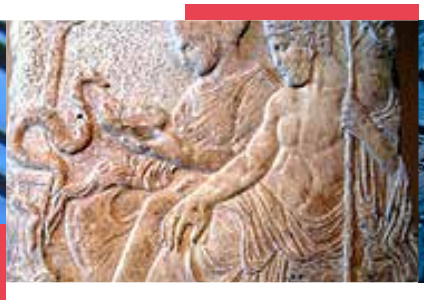
Ingénieur grande école | graduate programme

2ND AND 3RD YEAR SPECIALISATION

DIGITAL SCIENCES FOR LIFE SCIENCES AND HEALTHCARE

A cutting-edge programme in the transdisciplinary field of digital science and technologies (information processing and communication) applied to life sciences and healthcare technology.

Medicine, in particular, has moved into the Big Data age with the ramping up of high speed data for diagnosis and therapy. Biotechnologies are expanding significantly in fields such as green chemistry, the use of bacteria for biofuel synthesis, soil decontamination, the development of new biomaterials.



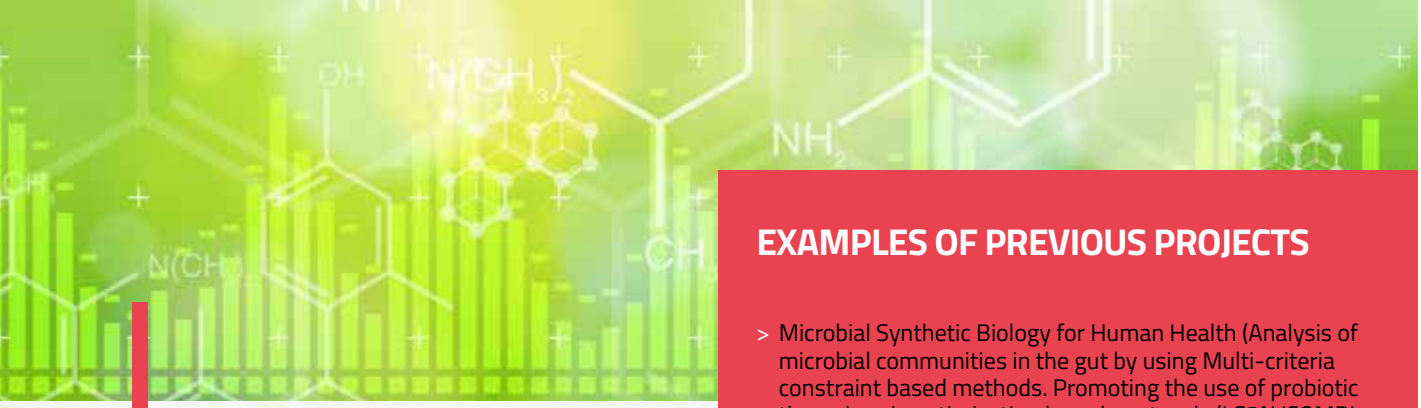
COURSE CONTENT

LIFE SCIENCES:
- Cellular biology
- Immunology
- Molecular biology, genetics, evolution
- Neurology and physiology

LIFE SCIENCES AND DIGITAL SCIENCES:
- Bioinformatics, genomics and "big data"
- Systems Biology: Discrete Modelling and Qualitative Analysis of Biological Networks
- Systems Biology: Probabilistic Modelling and Quantitative Analysis of Biological Networks

DIGITAL SCIENCES:
- Operating Systems and Databases
- Statistics and Machine Learning
- Computational Surgery
- Advanced Informatics

CONFERENCES AND PROJECTS
- Conference cycle
- Supervised project



INDUSTRY SECTORS

- Hospital sector
- Food industry
- Biomedical engineering and therapeutic bioengineering
- Pharmaceutical industry, chemicals and cosmetics
- Bioinformatics platforms
- Bio-technological development
- Innovation in environment and energy

TEACHING STAFF

HEAD OF SPECIALISATION:

Olivier Roux

CENTRALE NANTES LECTURERS:

Domenico Borzacchiello, Sophie Limou, Morgan Magnin, Jean-Yves Martin, Olivier Roux, Mathieu Ribatet, Aurélien Serandour

EXTERNAL SPEAKERS (UNIVERSITY OF NANTES, CNRS & INSERM):

Jérémie Bourdon, Romain Capoulade, Damien Eveillard, Yannick Guilloux, Abdelhalim Larhlimi, Loïc Paulevé, Xavier Saulquin

CONTACT:
olivier.roux@ec-nantes.fr

EXAMPLES OF PREVIOUS PROJECTS

- Microbial Synthetic Biology for Human Health (Analysis of microbial communities in the gut by using Multi-criteria constraint based methods. Promoting the use of probiotic therapies via optimization based-protocols (LS2N/COMBI, UMR 6004, Nantes)
- Contribution on learning time series data and analysis of dynamic models for participation in the DREAM11 Challenge (LS2N/MeForBio, UMR 6004, Nantes)
- Kinetic descriptions of the theory of evolution (ICI, Nantes)
- Single cell approach in cancer genomics and epigenomics: from cellular microfluidic purification to bioinformatics data analysis (CRCINA, UMR_S 1232, Nantes)
- Marker imputation in genetics or the move from the lab to 'in silico' (ITUN - CRTI - UMR Inserm 1064 –Nantes University Hospital)
- Image registration for two types of acquisition mode: fluorescence and beta-type radioactive imaging (SFR Santé François Bonamy UMS 3556 IRS-UN, Nantes)
- Machine Learning research on the automation of dermoscopic image recognition (Nantes University Hospital)

EXAMPLES OF PREVIOUS INTERNSHIPS

- Differentiation of T1 and T2 breast tumours by DNA methylation markers based on whole-genome bisulfite sequencing (CEA, Paris)
- Reduced order modelling for flexible prosthetic robots (University of Saragossa, Spain)
- Study of the long-term variability of DNA methylation (at the genome level) (INSERM, Lyon)
- Analysis of large-scale multi-dimensional genetic data (Institut Pasteur, Paris)
- Testing optimal control models of human saccadic eye movements (Radboud UMC, Nijmegen, Netherlands)
- Implementation of a protocol for a new skin imaging method (Laboratoire Clarins, Paris)
- Test the hypothesis of background genetic variation being a contributor to the off-target effects of CRISPR (Cancer Research UK, Cambridge Institute, UK)
- CNV detection from targeted sequencing data (Assistance Publique - Hôpitaux de Paris)
- Flow/mass cytometry and next-gen sequencing analysis (CLIP Laboratory, Prague, Czech Republic)
- Development and optimization of a compressed-sensing reconstruction algorithm to accelerate the acquisition of MRI images. Application for the detection of metastases. (CRMSB CNRS, Bordeaux)
- Simulation and study of neurons and their networks (CNRS, Lille)
- The role of normal and cancer RNA levels in the causation of colorectal cancer (Roslin Institute, Edinburgh, UK).
- Contraction of metabolic networks (Freie Universität Berlin, Germany)
- Multiplex PCR reaction modelling (bioMérieux, Marcy l'Etoile).

École Centrale de Nantes. Direction de la communication. may 2020