Are you intrigued by the physical forces at work inside cells? Does the nanoscale complexity of health and disease captivate you? Do you want to work in a cutting edge field that could revolutionize medicine? Then the Master’s programme in Nanobiology might be the perfect fit for you. We are a small, highly innovative and interdisciplinary programme applying high level math and physics to answer biological questions.

In Nanobiology, we integrate methods and theories from physics, and molecular biology, using tools from math and computer modelling to further understanding of the molecular basis of life.

What you’ll learn in the Nanobiology master has direct applications in research. Developments in biomedicine, such as studies on human genome variation and the control of stem cells, increasingly require analysis and quantitative description at the fundamental level. Moreover, it is becoming possible to develop artificial biomolecules and nanoparticles with wide applications in research and medicine. The incorporation of new biological building blocks is highly promising in for instance industrial biotechnology and medical science.

These advances will reshape many aspects of medical diagnosis and treatment. The rapid advancement of modern biomedical, biophysical and computational technologies promises to provide new tools to gain in depth knowledge of the fundamental molecular and cellular mechanisms controlling health or involved in disease.

Programme
The Nanobiology programme of TU Delft and Erasmus MC builds on the extensive existing research collaborations between the two institutes. The focus of the programme is on the molecular building blocks of living organisms and the tools to study them. The programme coursework is a mixture of theoretical and practical which deepens and broadens the...
knowledge students have acquired previously. It also includes two research projects, a small one that can be done as an internship at a company or in an academic research lab, and a larger independent project. The courses integrate physics, math and biology. Mandatory courses cover topics such as the study of cancer from a biological and physical perspective, modern high-resolution microscopy techniques and modelling of complex systems. Apart from the compulsory courses, there is a large selection of elective courses from both institutions.

Student profile
Students need a solid background in mathematics (including linear algebra, differential equations and statistics), physics, molecular biology and programming in order to succeed in the programme. Students may be eligible for a customized bridging programme.

Career prospects
The career prospects of Nanobiology graduates are excellent. The programme prepares students for a career in industry, research organizations, or public institutions. Graduates can find jobs in fundamental as well as applied research. Examples include life sciences or pharmaceutical companies, chemical companies, and jobs in the development of nano measuring methods and manufacturing technologies.

Research Projects
Graduation projects can be done at both TU Delft and Erasmus MC, creating a very broad spectrum of possibilities, from theoretical physics to biomedicine. Some examples of recent graduation projects are:

- Spacer Integration into CRISPR Locus by Cas1-Cas2 Complex in type II-A
- Exploring the 3D landscape of cellular membranes
- Pattern formation of surface bound proteins
- Coupling of elastic sheets to curvature inducing fields in cylindrical geometry
- Identification of trans-acting factors that regulate alternative cleavage by DROSHA
- Assembly of Mycobacterium tuberculosis clinical strains and comparative analysis of PE and PPE proteins using long-read sequencing data
- Synchronicity and patterning in the olivo-cerebellar and cerebello-cortical loops
- Development of a new batch correction method for scRNA-seq analysis
- Computer-assisted diagnosis of earlystage lung adenocarcinoma

RECENT INTERNSHIPS

- Cantrip: Cas12a activated nuclease poly-t reporter illuminating particles
- Computational platform development for box h/acasnorna-based rna editing system
- Faster, cheaper, better - a plate reader-based barrier integrity assay for the organoplate
- Greenhouse climate model with thermal screens
- Preventive inflammatory bowel disease proposal
- Optimising the barrier integrity assay in the organoplate
- The use of sers as rapid diagnostic technique for Sars-Cov-2