# WPitchD

## the PhD's pitch

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3 March 2021 - 5.30 PM

## AI in cancer: from DNA and other molecules to relevant models

*Ms. Marta Lovino, PhD Candidate, DAUIN.*

In recent years, the reduction of cost of Next Generation Sequencing (NGS) technologies has enabled the widespread of omics data: genomics (DNA), transcriptomics (RNA), proteomics (proteins), and many others. However, omics data are characterized by complexity and high dimensionality, which makes the biological interpretation a tricky process. Nowadays, AI contributed to the major technological advances in many fields, including biology. My work focuses on two areas in cancer analysis: gene fusion and multi-omics data integration. Gene fusions consist of a biological event in which two genes break and their portions are juxtaposed together, potentially causing cancer. Therefore, deep learning models have been exploited to predict the probability for a gene fusion to be involved in cancer genesis and progression. Since cancer is a complex phenomenon, one omic alone provides only partial information on the biological processes. Therefore, multi-omics data integration is crucial in the cancer domain and AI techniques allow a more efficient prediction.

## Air pollution monitoring for the smart cities of tomorrow

*Mr. Edoardo Giusto, PhD Candidate, DAUIN.*

Air quality, especially particulate matter, has attracted growing attention from governments, industry, and academia in recent years, motivating the use of denser air quality monitoring networks based on low-cost sensing strategies. However, low-cost sensors are frequently sensitive to aging, environmental conditions, and pollutant cross-sensitivities. These issues have been only partially addressed, limiting their usage.The talk would describe the development of a low-cost particulate matter monitoring system, deployed for monitoring air quality on both stationary and mobile sensor platforms. We explore the influence of all model variables and the quality of different calibration strategies. Tests of statically immovable stations include an analysis of accuracy and sensors' reliability made by comparing our results with more accurate and expensive standard β- radiation sensors. Tests on mobile stations have been designed to analyze the reactivity of our system to unexpected and abrupt events. These experiments embrace traffic analysis, pollution investigation using different means of transport and pollution analysis during peculiar events.

## Microwave imaging for brain stroke monitoring

*Mr. David O. Rodriguez-Duarte, PhD Candidate, DET.*

A brain stroke is a widespread disorder that affects around one in six people in their life, top-ranking worldwide as causes of death, disability, and dementia in otherwise healthy adults. It is a medical emergency caused by the interruption of the regular supply of oxygen-rich blood to the brain, leading to the loss of millions of brain cells per minute. Thus, requiring prompt treatment. Stroke care widely relies on brain imaging technologies, identifying the specific pathophysiologic conditions for tailored treatment and enhancing effectiveness. The most well-established solutions are computerized X-ray tomography (CT) and magnetic resonance imaging (MRI). Moreover, in recent years microwave imaging (MWI) has emerged as a complementary technology that allows early diagnosis and bed-side follow-up. MWI relies on the electric contrast between the healthy brain tissues and the pathologies to retrieve essential diagnostic information according to their typology and their physiopathological status.


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