

PRESS RELEASE

Recognizing Pathogenic Bacteria More Quickly and Effectively

A collaboration between two centers of excellence in innovation - SISSA in Trieste and the company Alifax S.r.l.- has led to the development of a new technology capable of identifying infectious germs with greater accuracy. Prospects for clinical applications are significant.



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Identifying infectious bacterial species more accurately and quickly to help doctors make more targeted therapeutic decisions for patients is the goal that has driven the collaboration between two centers of excellence in the Friuli Venezia Giulia region: the researchers of the "Algorithmic Development for Data Analysis" group at SISSA (Scuola Internazionale Superiore di Studi Avanzati) in Trieste and the company Alifax S.r.l.. Alifax S.r.l. is a Padua-based firm that has expanded its presence in Friuli Venezia Giulia by establishing its Research and Development department in the region and fostering synergies with much of the local innovation ecosystem. SISSA scientists specifically worked on optimizing a

diagnostic tool already developed by the company, I-dOne, refining its performance to make it more reliable, precise, and aligned with the most advanced clinical needs. This important result was achieved using sophisticated mathematical and computational tools developed through basic research.

The fast, simple, and cost-effective identification of bacterial species causing infections is crucial in guiding doctors' decisions. The developed diagnostic system has proven particularly efficient in this regard. The technology resulting from this collaboration is based on ATR-FTIR (Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy). This technique identifies bacterial species by acquiring the infrared signal of the analyzed sample, reflecting the biochemical components of the germ.

The new instrumentation produced by Alifax S.r.l., already available for use in clinical laboratories and sold across three continents, demonstrates the success of a collaboration that has effectively combined diverse expertise: fundamental academic research and more directly applied knowledge.

"To enhance the instrument's ability to recognize different bacterial species, we used classification algorithms studied and developed by my research group," says Alessandro Laio, project lead at SISSA. "This collaboration has also been valuable for our research, as it has pushed us to test our data analysis methods on real-world data."

Alifax S.r.l. President Paolo Galiano comments: "The long-standing and continuous collaboration with SISSA and other research institutions in the region has allowed our company to achieve constant growth in knowledge. Our goal is to drive our products toward increasingly advanced technologies."

SISSA and Alifax S.r.l. plan to further strengthen their collaboration by exploring new applications of the developed technologies and expanding the scope of research. Their joint efforts have already laid the foundation for new diagnostic solutions, reaffirming the value of cooperation between academic institutions and industry.

Alifax, a company specialized in hematology, microbiology, and molecular biology, has always been involved in strategic collaborations with universities, hospitals, and international research centers. Alifax has successfully expanded its global influence, exporting its solutions to over 130 countries. From its headquarters in Polverara, in the province of Padua, the company has extended its presence in Friuli Venezia Giulia with two locations: one in Nimis (Udine) and another in Trieste, at the Area Science Park campus in Basovizza. Here, the subsidiary Alifax R&D operates,

integrating into a network of local research excellence and establishing synergies with key institutions such as ICGEB, Elettra Synchrotron, CNR IOM, and the University of Trieste.

SISSA, Scuola Internazionale Superiore di Studi Avanzati, was founded in 1978. SISSA is a scientific center of excellence at both national and international levels. It is located in Trieste, Italy, and consists of approximately 70 professors, 120 research fellows, 300 PhD students, and 120 technical-administrative staff members.

SISSA's research activities are mainly focused on three areas: Physics, Neuroscience, and Mathematics. All scientific work conducted by SISSA researchers is regularly published in leading international journals with high impact factors and frequently appears in prestigious publications such as *Nature* and *Science*.

The high quality of research at SISSA is further confirmed by its strong position in the highly competitive field of European funding. Among Italian scientific institutions, SISSA ranks among the top in terms of research funding obtained, relative to the number of researchers and professors.

IMAGE

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