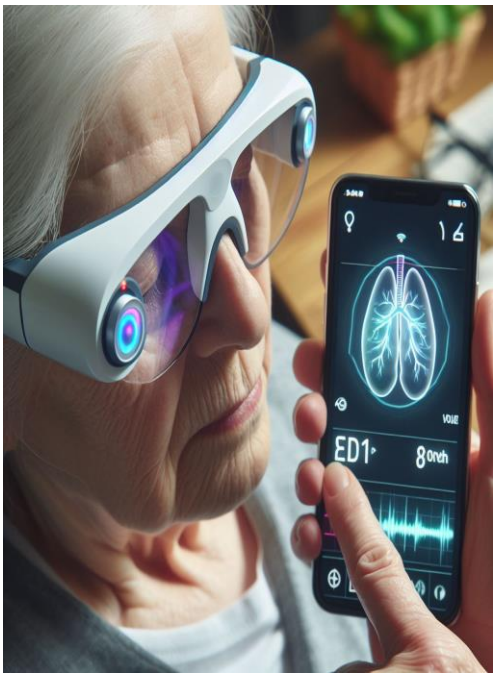
Engineering Innovations for Health: Dr. Alireza Bahramian's Journey in Disease Diagnosis through Tear Analysis:

Dr. Alireza Bahramian has completed his bachelor's, master's, and doctoral degrees in Polymer Engineering and Chemical Engineering from Isfahan University of Technology and University of Tehran, respectively. Throughout his academic journey, he has conducted extensive research and gained valuable experiences in various fields.



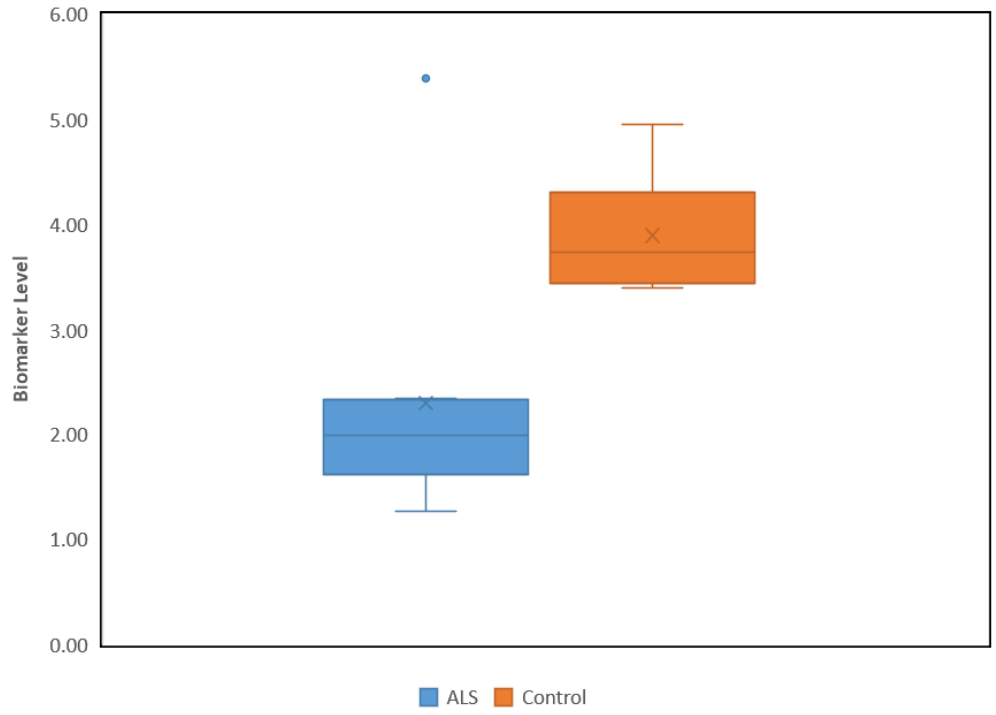
During his doctoral studies, he had the opportunity to pursue his education at Heriot-Watt University in the United Kingdom under the supervision of the late Professor Danesh, conducting profound research on predicting interfacial tension in liquid-liquid systems. The outcomes of his research have led to the development of theories and models for predicting and understanding the structures and properties of liquid-liquid, liquid-gas, liquid-solid, and gas-solid interfaces. The applications of these results in the oil industry have resulted in numerous projects focusing on solid surface wettability and, specifically reservoirs, with various industries. The laboratory he established at the Institute of Petroleum Engineering at the University of Tehran is one of the most equipped laboratories in Iran for studying the physics and chemistry of surfaces. Over the

years, he has focused mainly on investigating the surface properties of water droplets in the presence of other fluids and, in collaboration with reputable universities worldwide such as the University of Oxford in the UK, he has strived to acquire the necessary knowledge to understand interfacial structures.

These research activities, mostly conducted in the field of petroleum engineering, have not only led to the training of numerous postdoctoral, doctoral, and master's students but have also resulted in the publication of over 100 ISI papers in this field, leading him to explore other applications of these subjects. He became particularly interested in two types of systems: those with few components but numerous droplets (such as clouds) and those with a very large number of chemical components and limited droplets (such as a tear drop). Regarding the former, he, for the first time, designed and delivered a course for master's and doctoral programs in the Faculty of Chemical Engineering on the thermodynamics of clouds, delving into the role of surface and interfacial phenomena in the formation of clouds and precipitation of rain and snow, as well as the effect of pollutants and pollution-generating systems (such as highways) on this process. Concerning the latter, he conducted pioneering research on the surface properties of tears in Parkinson's patients. Given the importance of the subject and the obtained results, they launched a startup in Canada in this field, shifting their focus more towards the fields of biology and medicine since 2018.

In this regard, in addition to collaborating with prestigious universities such as the University of Oxford in the UK, Calgary, and McGill University in Canada, as well as the Artificial Intelligence Group of the School of Electrical and Computer Engineering at the University of Tehran, they have embarked on new and innovative research in the field of diagnosing various diseases, including Parkinson's and ALS, through tears. One of the most significant achievements of these activities, which has been tested on nearly 30 human samples, is a non-invasive eyepiece that can reliably differentiate between ALS patients and healthy individuals through tear analysis. This product is currently undergoing validation and obtaining necessary licenses for field testing, with the hope that it will aid in the diagnosis of other diseases such as Parkinson's and Alzheimer's, making the path to treating these diseases smoother.

Given Dr. Bahramian's expertise and extensive experience, we hope that his research and activities in improving human health and quality of life will benefit the international community.



The image illustrates the differential levels of the identified biomarker in the tears of ALS patients compared to those of healthy individuals.

Dr. Bahramian is shown utilizing the ALScan prototype, which is engineered to collect and analyze ocular gas biomarkers for the detection of ALS.