If you have physically or digitally (via live-streaming) attended the AIMed Breakfast Briefing: Experience the future of AI in Radiology, held respectively in Chicago, Boston and Toronto, between 9 and 11 April, you probably saw our sponsor: SOPHiA GENETICS.

The tech company is tapping into artificial intelligence (AI) to "Democratize Data-Driven Medicine". Its’ AI technology, SOPHiA, analyzes genomic profiles to assist clinicians in giving improved diagnoses and treatment plans. A year ago SOPHiA gained radiomics capabilities. The added feature is further empowering medicine, particularly in the areas of oncology.

AIMed spoke with SOPHiA GENETICS’ Senior Vice-President Radiomics and renowned mathematician, Thierry Colin, to find out more about SOPHiA Radiomics as well as their views towards AI in medicine.
**AI MED:** For the benefits of readers who do not know, what is the significance of combining genomics and radiomics?

**THIERRY COLIN:** In order to determine the best possible cancer treatment or care plan for an individual patient, the tumor board needs to gather all available information (clinical, radiology, biology, pathology) it can get. Oncologists then use their expertise and this information to assess diagnosis and prognosis, and to monitor the progression of the disease as well as the efficiency of treatment.

SOPHiA Radiomics already simplifies the tumor board’s task by centralizing all useful information in a unique place. But the scope of this application doesn’t stop there; by extracting valuable data from the image and truly combining it with the genomic profile of the tumor, SOPHiA Radiomics provides a new kind of quantitative information for a better outcome. It means that Physicians are now armed with even more information to decide on the kind of treatment that best fits the patient.

**AI MED:** Radiomics studies tend to extract dozens or even hundreds of image features. Machine Learning studies also require large datasets which may not always be available. How do you address this challenge and deliver statistically relevant and accurate Radiomics results?

**TC:** First of all, yes; Extracting hundreds of features might sound very tempting but could indeed end up being counterproductive. This is why we developed SOPHiA Radiomics in close collaboration with healthcare professionals, as a way to identify the most critical sets of features and extract only the most valuable ones. Even though we can still adapt features extraction to the customer’s needs.

Secondly, SOPHiA Radiomics aims to work first with very specific diseases in order to minimize variability. We may not underline each and every tumor for the moment, but we are working on certain specific sub-types and dealing with actual clinical data. This is the same kind of bottom up approach that we applied from inception, and that allowed us to develop highly performant genomic applications that now cover a full range of disorders.

Finally, the vision of SOPHiA GENETICS, is to create a community of users enabling improved patient care worldwide. Our genomic community already groups over 930 healthcare institutions in 80 countries. In the radiomics field, connecting professionals from around the world through SOPHiA’s community will help overcome this lack of available local cases.

**AI MED:** You mentioned something about “user-community”. So, while setting up a “user-community” may be the key to defining accurate Radiomics-based predictive models, how do you cope with variability in terms of imaging protocols?

**TC:** Technically, there is a need for reproducible segmentation and features extraction tools. The Image Biomarkers Standardization Initiative (IBSI) is grouping major healthcare institutions all over the world in order to implement a set of recommendations for automation and standardization of features extraction. We are working so that, everything that we compute from the image will comply with this set of guidelines.

**AI MED:** There has been a lot of talk about AI diversity these days. SOPHiA AI platform is being employed in many hospitals in different continents, but different countries have different resources and AI adoption rate, how does SOPHiA address those cultural differences?
**TC:** The vision of SOPHiA GENETICS is the democratization of Data-Driven Medicine worldwide. We are building advanced technologies to help healthcare institutions provide faster and more accurate diagnosis and treatment to patients. We're also growing a community that promotes the sharing and accessibility of valuable knowledge. These actions pave the way to a more performant, more sustainable, hence more accessible healthcare system. The global adoption of our technology, trusted by over 930 hospitals to date, shows that Institutions all over the world understand the benefits they can get from our innovative approach and SOPHiA's top analytical performance.

**AI MED:** Perhaps to some people, “democratizing data-driven medicine” is still a novel concept, do you mind explaining more?

**TC:** Of course. As explained before, we bring tech recipes to the healthcare industry to better analyze genomic and radiomic data; feeding healthcare professionals with knowledge and valuable information they didn't have before, to improve medicine. That's the Data-Driven Medicine part.

Beside this technology aspect, the three other pillars of our action are Community, Universality and Support. The community makes this knowledge available to all our users. The universality of our platform, that adapts to the needs and means of the users, allows anyone around the world to access our technology. Finally, our local teams of experts are there to understand the needs of institutions and support them in the implementation of Data-Driven Medicine's applications. This is what “democratizing” means, this is our mission.

**AI MED:** That's brilliant! But how does SOPHiA uphold democratization of Data-Driven Medicine and respect patients’ privacy at the same time?

**TC:** Obviously as the champion of Data-Driven Medicine, it is our duty to secure data privacy and security. We are ISO27001 certified for Information Security Management and audited regularly. SOPHiA GENETICS thus respects international and national privacy regulations, meaning that we only act as a processor of anonymized and encrypted data. In short, the healthcare institutions that we work with have full control over the data that remains in the ownership of individuals, and we don’t have access to patient’s personal data under any circumstances.

**AI MED:** SOPHiA received a $77 million Series E funding at the turn of the year. How will you use these resources and what will be the focus for SOPHiA GENETICS in the future?

**TC:** We’re expanding our presence dramatically in the US in order to face the growing demand in the region. In parallel, we continue to develop SOPHiA by adding analytical capabilities and combining different sources of medical data. SOPHiA Radiomics is the first example of that.

We'll also continue to support and grow our large network all over the world. This is why we are talking about the democratization of Data-Driven Medicine worldwide. We encourage every institution to adopt such tech applications, not only for the direct benefit for their patients but also because it allows for a more sustainable global healthcare system where the information used to help patients today will help those of tomorrow.