Bridging the Knowledge Gap Through AI

Enrica Quattrocchi, MD, examines cutaneous melanoma by applying AI to distinguish between slow growing and aggressive melanomas.

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Two years ago, Enrica Quattrocchi, MD, was still writing research papers and living in Sicily, Italy but soon that all changed. “I have a passion for research and wanted to do something that had a real impact on peoples’ lives,” says Quattrocchi.

“Then melanoma found me,” she explains.

After graduation, Quattrocchi came to work at the Mayo Clinic where she found a mentor in Alexander Meves, MD, and pulled her nose out of the books and moved into the lab.

Today, she is a clinical dermatology research fellow and translational scientist in the Dermatology Department.

When an email about the MRA Dermatology Fellowship Award Request for Proposals came through, Quattrocchi jumped at the opportunity. She is quick to recount a Winston Churchill quote about not fearing failure nor losing enthusiasm. It is with this mindset that she jumped all-in on her research project entitled “Melanoma Staging by Artificial Intelligence (AI).”

“Our current staging system,” explains Quattrochi, “has a number of weaknesses. The sizes and concepts don’t always work well.” Quattrocchi is referring to the American Joint Committee on Cancer (AJCC) 8th edition guidelines--the current classification system for describing the extent of disease and prognosis--which is heavily dependent on the tumor invasion depth or thickness (otherwise known as Breslow depth). “New methods are needed to better identify patients who are likely to relapse but remain unidentified using conventional staging parameters. This is where AI can help.”

In particular, Quattrocchi’s study examines cutaneous melanoma by applying AI to distinguish between biologically indolent (or slow growing) and aggressive melanomas. This work would help not only identify melanomas, but also patients at higher risk of relapse who might have been overlooked using conventional staging parameters.

“Too many patients die for something that is mistaken as a simple mole while others have

unnecessary invasive surgeries," explains Quattrocchi. When staging is inaccurate, patients may also miss out on treatment opportunities, such as the ability to undergo adjuvant therapy following surgery or to consider enrolling into a clinical trial.

Quattrocchi is partnering with Meves on the study as well as Dennis Murphree, PhD, Co-Director of the Mayo Clinic's Office of Artificial Intelligence in Dermatology. Murphree has expertise in applying quantitative methods to solve real-world problems.

"Right now, our predictive model is close to 83% [accurate] and we are continuing to make refinements," says Quattrocchi. If the model is able to distinguish between slow-growing cancers and those that will aggressively metastasize, it could revolutionize the prevention, diagnosis, and treatment of melanoma.

"Research is progress. It advances patient care. To do it, however, requires stamina, originality, and persistence. I've been blessed to be on a wonderful team of people who are passionate. My word for this project is 'excitement.' I am so excited and so thankful for my mentor and for MRA for believing in me," says Quattrocchi.

"For me, this funding means hope for new therapies and enthusiasm for the next challenge ahead."

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