

Application: 4761

## Bringing AI Cancer Testing to Patients with MSIntuit CRC

<b>Page: General Information</b>
Provide information about the company to be considered for the award. If you will be nominating an individual, specify the nominee's employer.
<b>Name of Organization/Company</b> Owkin
<b>Additional Contacts</b> I do not wish to list additional contacts
<b>Page: Entry Information</b>
<b>Entry Title</b> Bringing AI Cancer Testing to Patients with MSIntuit CRC
<b>Category</b> P04. Technology Breakthrough of the Year - Healthcare Technology
<b>Technology Breakthrough of the Year Submission Format</b> Written Answers

**a. Briefly describe the organization that achieved the nominated technology breakthrough: its history and past performance (up to 200 words). Required**

Owkin is an AI-biotech that combines the best of human and artificial intelligence to ensure every patient gets the right treatment. We use AI to understand complex biology and integrate prior knowledge via large language models into our AI's understanding, transposing results from real experiments to strengthen our predictions.

Our AI is trained on multimodal biomedical data to fuel target discovery, drug positioning, clinical trial optimization and diagnostics solutions. We continuously invest in research to improve our AI models to be best-in-class, and published our findings in 50+ academic journals since 2018. Our AI is interpretable, allowing collaboration of the world's best AI and medical experts to continually improve model performance.

In January 2024 we won the UBC-OCEAN Kaggle AI competition (out of 1,300 teams) by using our proprietary foundation model to predict ovarian cancer subtypes from histology images.

Owkin also founded MOSAIC, the world's largest multi-omics atlas for cancer research. MOSAIC is a global initiative uniting top academic centres and industry partners to create the world's largest spatial omics and multimodal dataset in oncology.

**b. Outline the nominated technology breakthrough. Be sure to describe it in terms that someone with limited knowledge of the technology can understand and appreciate (up to 250 words). Required**

Colorectal cancer (CRC) is the second most common cause of cancer death worldwide, but precision therapies have recently been approved for patients who carry a biomarker called Microsatellite Instability, or MSI. These patients make up ~15% of the CRC population and it is crucial to find out each patient's MSI status.

Owkin developed MSIntuit® CRC, the first CE-marked AI diagnostic to prescreen for MSI. To do this, Owkin will leverage H&E WSI (hematoxylin and eosin stain whole slide images) + MSI-status patient data from multiple academic centers and hospitals. MSI is found in a broad range of solid tumor types and is a strong predictor of the effectiveness of PD1 therapies, such as Merck's Keytruda.

It aims to have a significant impact on doctors and patients by decreasing workload and turnaround time, and preserving tissue material and resources. Using AI, this innovative tool supports reproducibility by addressing the possibility of different pathologists interpreting MMR/MSI status differently, to optimize quality and efficiency for critical tests and help to facilitate better access to immunotherapy.

There is also a need for AI diagnostics that can both ease bottlenecks and resource pressures while also ramping up biomarker testing to match patients with optimal treatments across various cancer types. So, Owkin has partnered with MSD to develop and commercialise MSIntuit® across four additional types of cancer: endometrial, gastric, small intestinal, and biliary where the need to have efficient and robust screening is crucial given the low prevalence of MSI phenotypes in such cancer types.

**c. Explain why the technology breakthrough you have highlighted is unique or significant (up to 250 words). Required**

Currently, there are approximately over 108,000 pathologists in 162 countries and territories, representing about 98.5 percent of the world's population (data collected in 2019–2022 by Andrey Bychkov). Considering North America with 50 pathologists per 1M as a model, there is a significant (4x less than needed) shortage of pathologists on a global scale. As demand for MSI screening for CRC patients (and beyond) increases, so too does the testing burden for pathologists and labs—creating bottlenecks and resource pressures.

Owkin found that MSIntuit® CRC performed consistently across the scanners, with a sensitivity of 96% and 98%, as published in Nature. This matches current gold-standard diagnostic methods, such as IHC and PCR testing. When used by pathologists, MSIntuit® CRC serves as a pre-screening solution designed to rule out a significant group of patients from the MSI testing pool.

This validation shows a specificity of 47% and 46% (source: MSIntuit® CRC validation [Nat Comm, 2023]) across the scanners - meaning that almost half of non-MSI patients, also known as MSS status, could avoid further testing in combination with high NPV of 99% and 98% providing strong level of confidence for the pathologist and the patient.

Our research was also interpretable. Pathologists could identify inflammation and mucus in the regions of the slide predictive of MSI. These features align the AI results with what pathologists have previously seen with MSI status in colorectal cancer tissue, giving further credibility to the solution performance.

**d. Reference any attachments of supporting materials throughout this nomination and how they provide evidence of the claims you have made in this nomination (up to 250 words). Optional**

Using MSIntuit® CRC in clinical routine, pathologists can rapidly rule out almost 50% of non-MSI cases prior to any standard MSI testing technique. With MMR-IHC turnaround time varying between one to few days in different clinical settings and MSI-PCR results delivery that can take more than a week, pre-screening for non-MSI patients with MSIntuit® CRC in a few hours holds a real potential of:

- Increasing the speed and turnaround time of MSI diagnosis for CRC patients
- Improving effectiveness of MSI testing workflow
- Facilitate better access to immunotherapy
- MSS-AI patients avoiding additional testing thanks to a high diagnosis precision

Owkin trained a deep-learning model on 859 whole slide images from patient tumours, where we knew whether each patient had the MSI biomarker or not. This model works by selecting features from small areas of the slide image, called tiles, using a feature extractor itself trained on four million unlabeled tiles from colorectal cancer pathology images. After training, the model was blindly validated on 600 further whole slide images, with specimens coming from more than 10 institutions, each scanned twice, with slide scanners from different manufacturers.

**Webpage Link**

<https://www.nature.com/articles/s41467-023-42453-6> (<https://www.nature.com/articles/s41467-023-42453-6>)

**Would you like to add an additional webpage link?**

Yes

**Webpage Link 2**

<https://vimeo.com/901896323> (<https://vimeo.com/901896323>)

**Would you like to add an additional webpage link?**

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**Webpage Link 3**

<https://oncologypro.esmo.org/meeting-resources/esmo-congress-2022/blind-validation-of-msintuit-an-ai-based-pre-screening-tool-for-msi-detection-from-colorectal-cancer-h-e-slides?page=1> (<https://oncologypro.esmo.org/meeting-resources/esmo-congress-2022/blind-validation-of-msintuit-an-ai-based-pre-screening-tool-for-msi-detection-from-colorectal-cancer-h-e-slides?page=1>)

**Would you like to add an additional webpage link?**

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**Web Page Link 4**

<https://www.owkin.com/newsfeed/owkin-enters-collaboration-agreement-with-msd-to-develop-ai-powered-diagnostics-for-cancer> (<https://www.owkin.com/newsfeed/owkin-enters-collaboration-agreement-with-msd-to-develop-ai-powered-diagnostics-for-cancer>)

**Would you like to add an additional webpage link?**

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**Web Page Link 5**

<https://www.owkin.com/msintuit-crc> (<https://www.owkin.com/msintuit-crc>)

**Would you like to add an additional webpage link?**

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**Web Page Link 6**

<https://thepathologist.com/outside-the-lab/constant-demand-patchy-supply> (<https://thepathologist.com/outside-the-lab/constant-demand-patchy-supply>)

**Would you like to add an additional webpage link?**

No

**Supporting Document**

No File Uploaded

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No

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