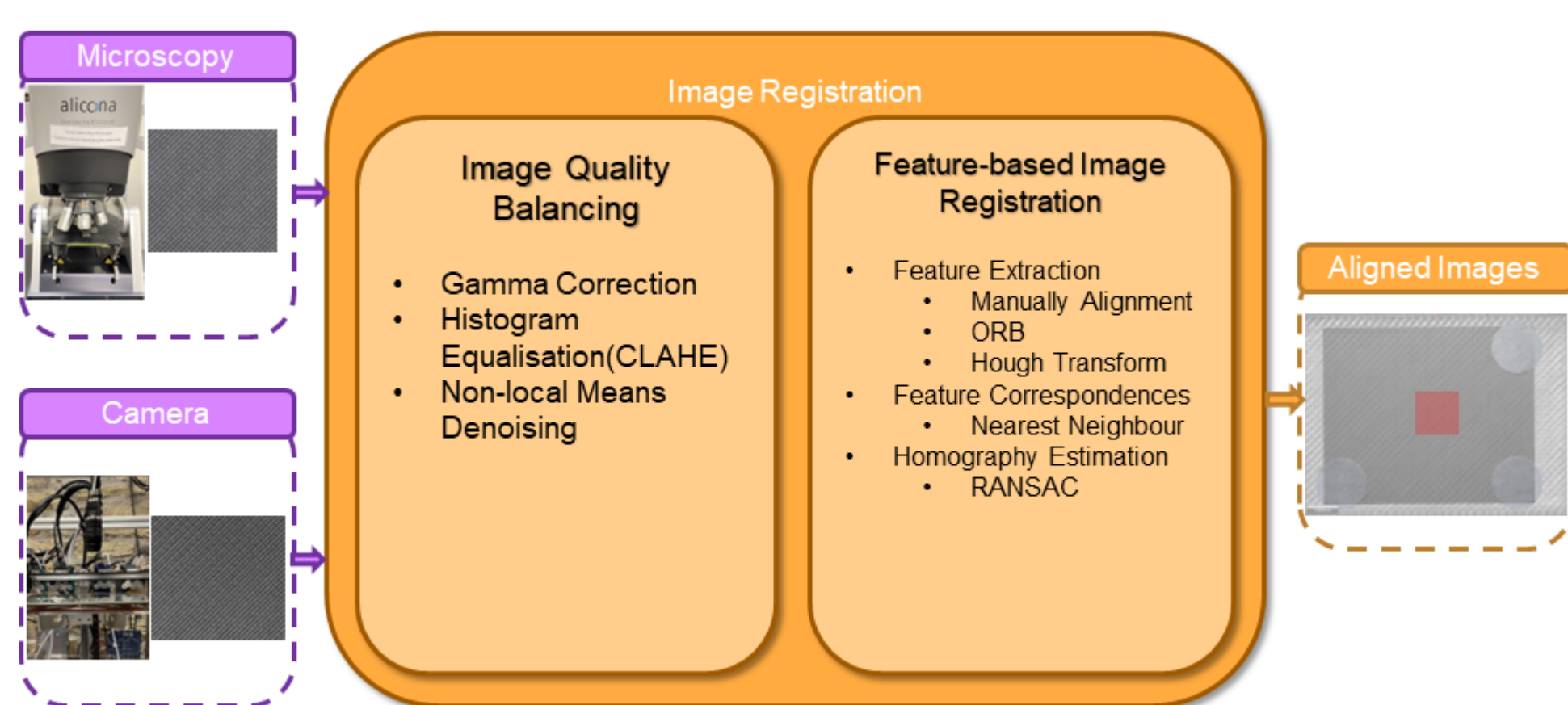


CV is needed for in-situ topography

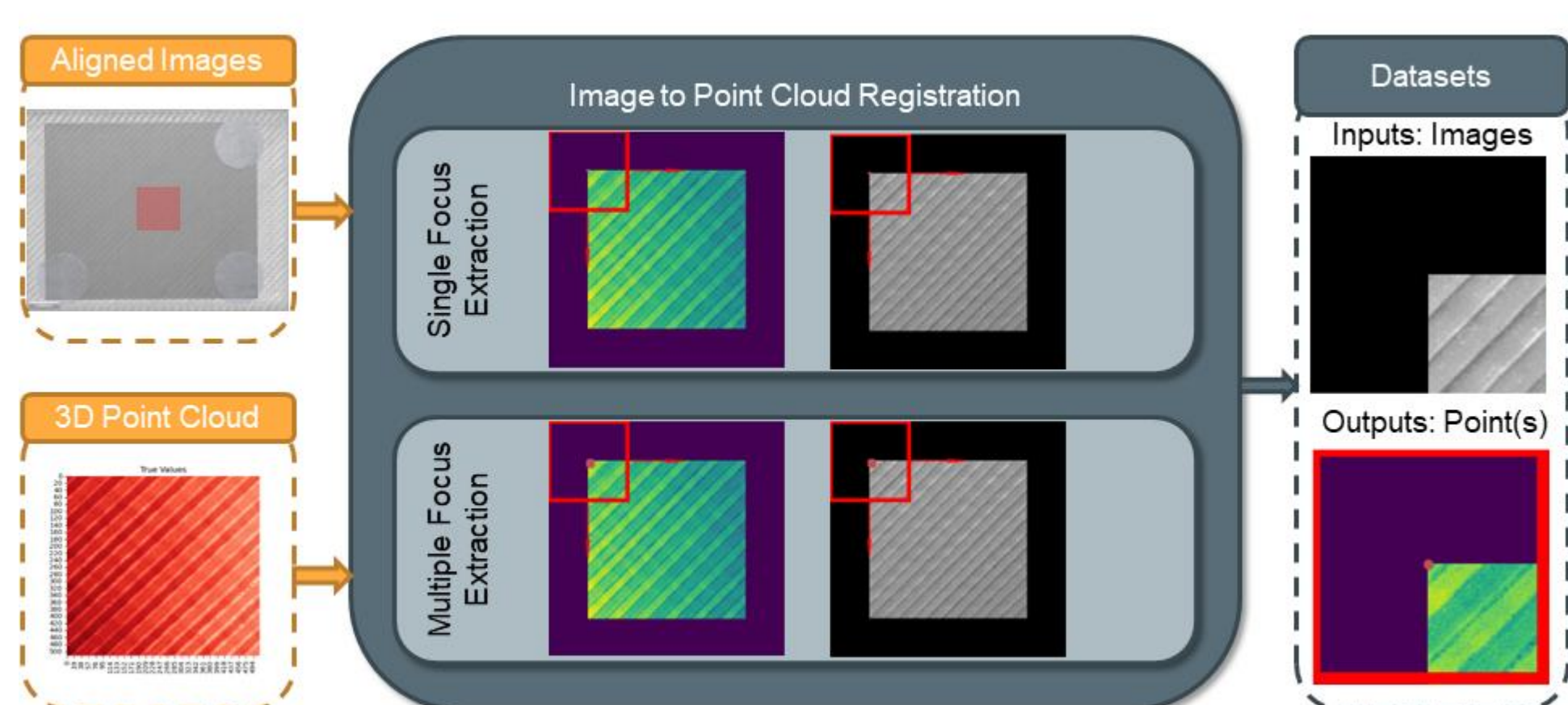
Camera-based In-situ surface topography measurement can be enhanced by microscopy. Microscopy is hard to deploy to a real-time measurement scenario, but cameras are not. No robust connection found yet to effectively bridge the abilities of both devices. M2CNet based on Computer Vision is a solid solution.

Microscopy to Camera (M2CNet)

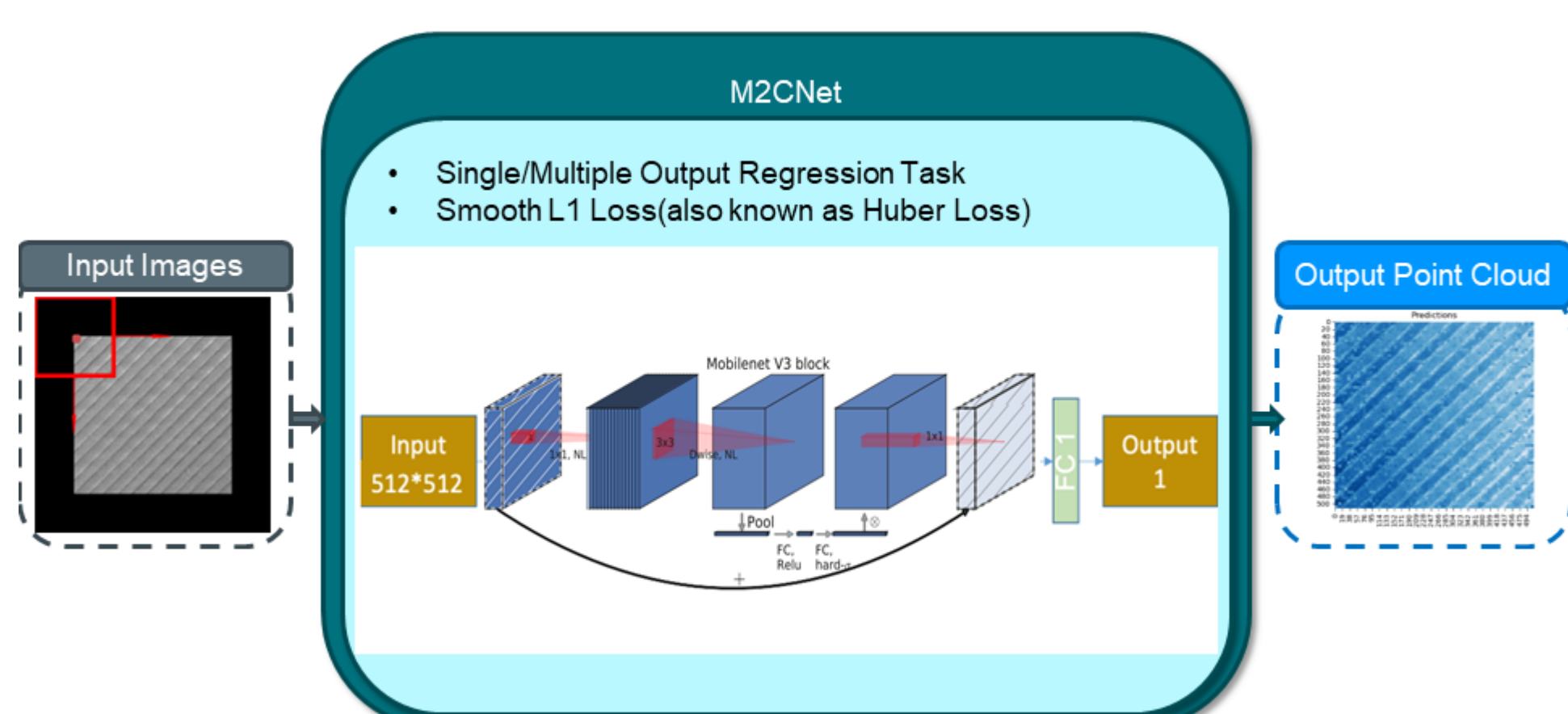
Step 1: Image registration to make the images more alike and crop the region of interest



Step 2: 2D to 3D registration to build input and output datasets with window sliding technique

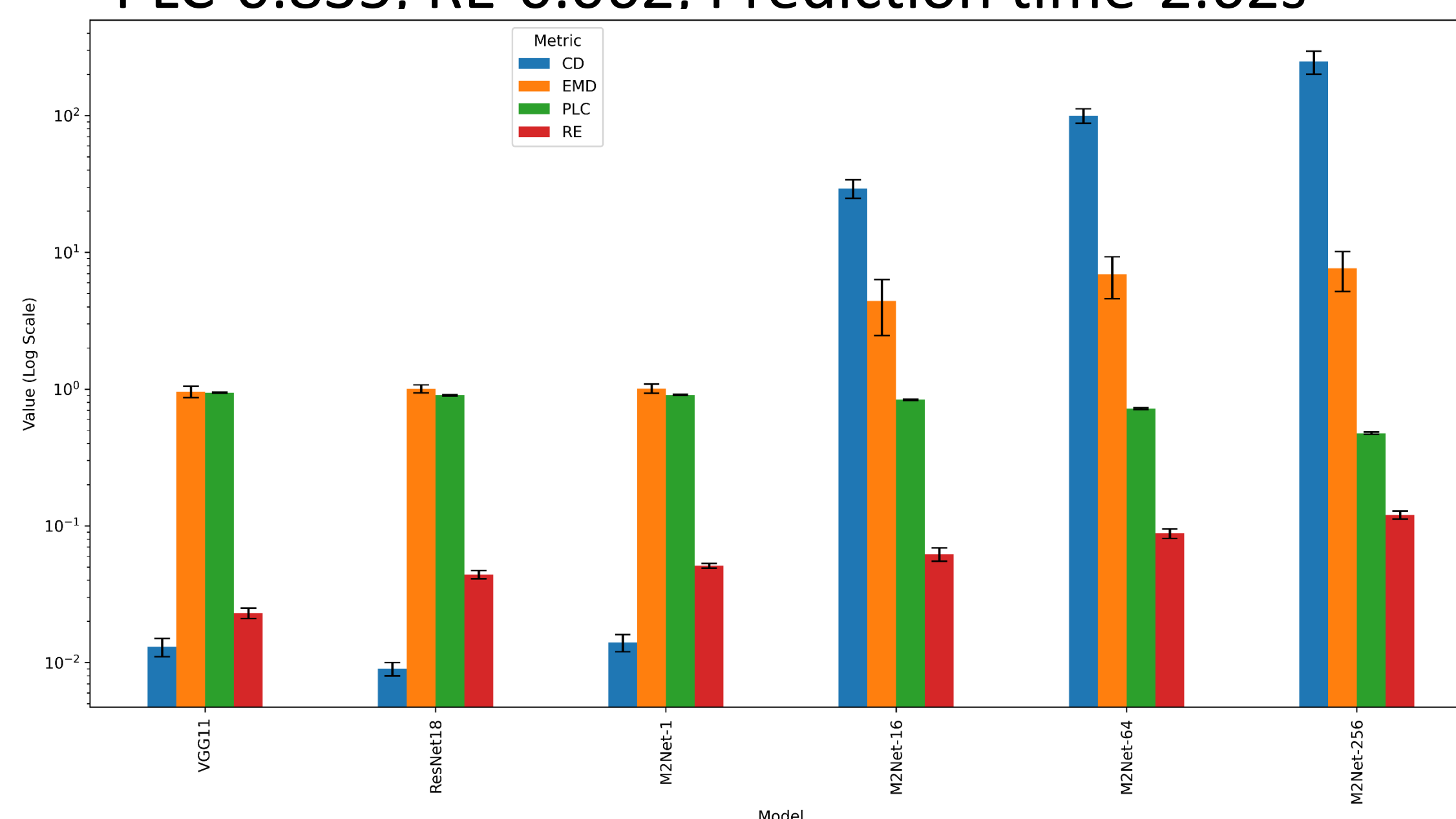


Step 3: Proposed M2CNet to bridge the images from camera and point cloud from microscopy

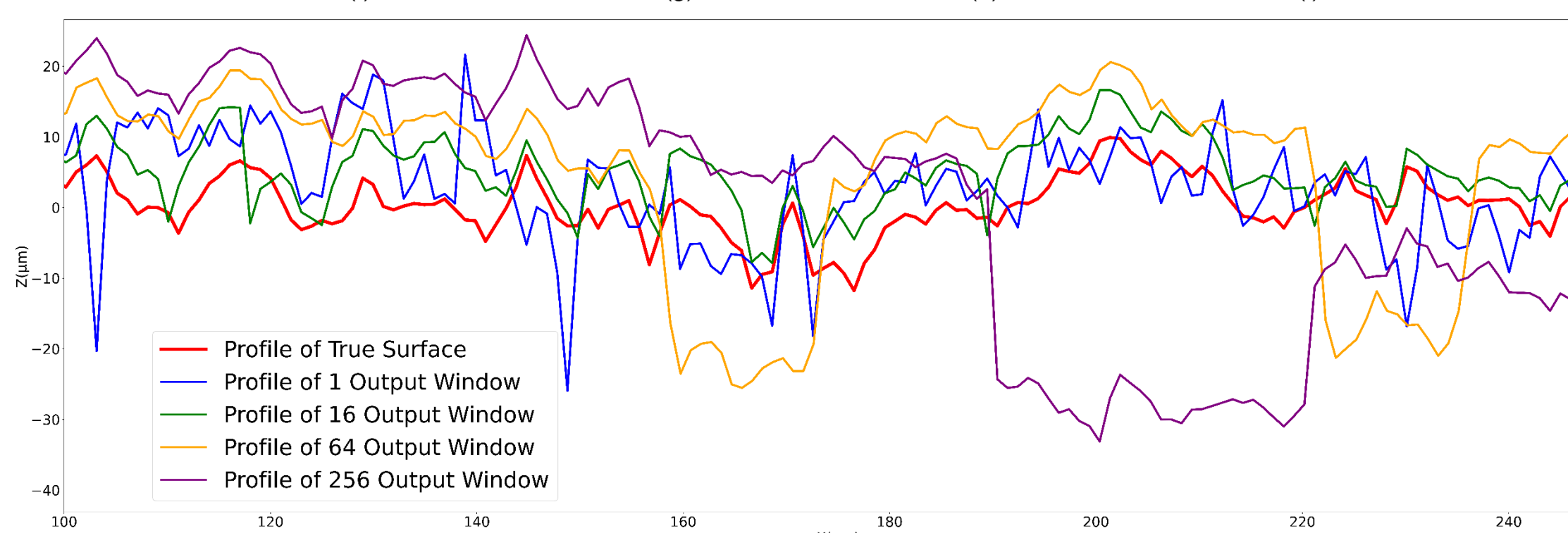
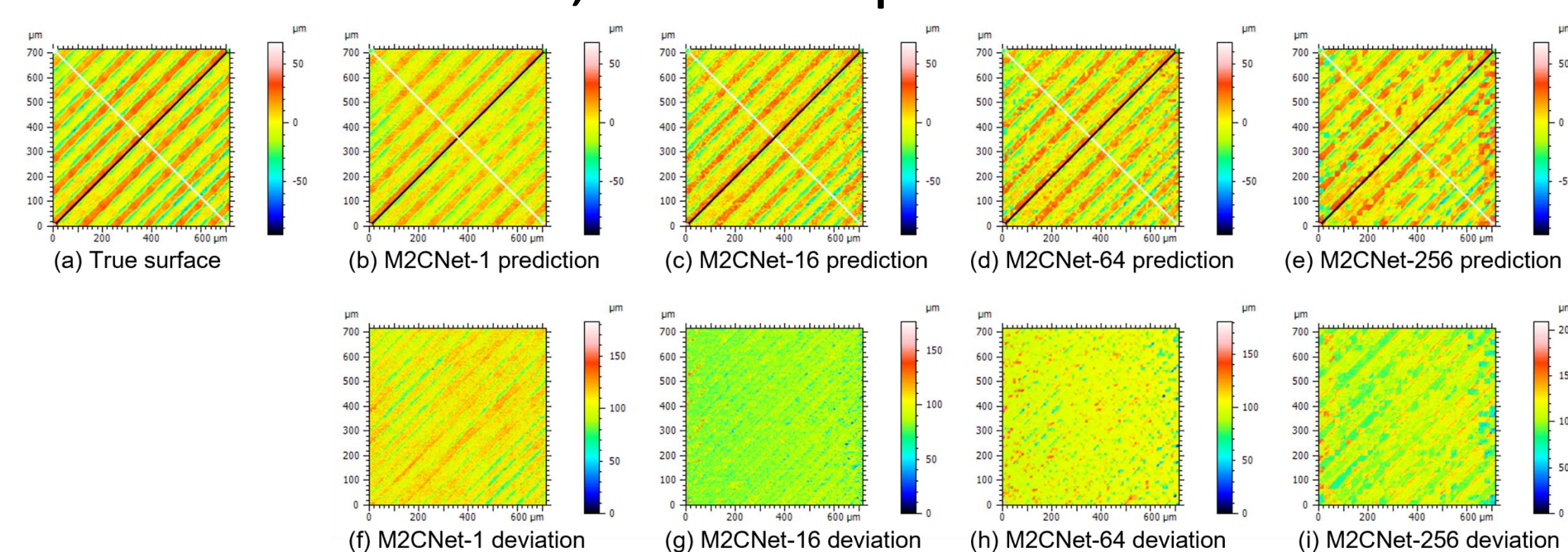


Results

Model performance: CD-29.364, EMD-4.396, PLC-0.835, RE-0.062. Prediction time-2.62s



Surface topography prediction: Sq-16.30 μ m with 6.4% error, Sa-12.69 μ m with 7.5% error



Conclusion and future work

M2CNet points out an effective way to apply cheap devices to complex tasks. Future work includes expanding the variety of the dataset, addressing spatial correlation with better feature extraction techniques, and conducting an in-situ surface topography measurement based on ME AM.

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