Q1. Title of Research Project
Physics-Driven Machine Learning for Computational Imaging

Q2. Timeframe
Project Start: 01/10/2021   Project Completion: 31/03/2023

Q3. Project Synopsis

Recent years have witnessed a rapidly growing interest in next-generation imaging systems and their combination with machine learning. Different from simple image restoration problems, computational imaging usually involves physics-based properties, such as the imaging processes and domain knowledge. In this collaboration, Prof Jong Chul Ye and Bihan Wen aim to tackle such compelling challenges, by incorporating various physics-based priors into the learning scheme, to achieve a highly effective computational imaging scheme.

To lead the research effort, we have organized the workshop series on Machine Learning for Computational Imaging @ ICCV 2021 (https://sites.google.com/view/lci-iccv2021/home), i.e., one of the top AI conferences. Besides, we have successfully edited two special issues, as the Lead Guest Editors, at IEEE Signal Processing Magazine (top IEEE magazine with IF >15) on Machine Learning for Computational Imaging, which hosted more than 20 top survey and tutorial papers in this field, from world top researchers.

Supported by the ASPIRE seed grant, Bihan has invited Jong to visit NTU in 2022, who gave a seminar talk to NTU's faculties and students. Figure 1 shows the event.

Figure 1: Invited Seminar by Prof Jong Chul Ye, at NTU 2022.

Later Dr. Bihan Wen has also been invited to give a tutorial at ISBI 2023 and a keynote speech at SlowDNN 2023, to share some of our results from this collaboration. Figure 2 shows the seminar event at SlowDNN 2023.

Figure 2: Invited Keynote Speech by Dr. Bihan Wen, at the SlowDNN Workshop 2023.

The collaboration supported by this ASPIRE Seed project is highly fruitful. Both Jong and Bihan have served for the IEEE Computational Imaging (CI) TC. They will maintain the collaboration after the seed grant support to complete more joint works.