



SEMINAR

Imaging with Blur: Using Motion to Enable Wide-Field Imaging at the Resolution Limit

Date: 10 August, 2026 (Monday)
Time: 4:00 p.m.
Venue: Room 7-34 & 7-35
Haking Wong Building
HKU

Speaker: Professor Rashid Zia
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Abstract:

Conventional optical imaging (e.g., in materials characterization and biosensing applications) involves suboptimal tradeoffs between image field size, resolution, and speed. One can generally obtain diffraction-limited, high-resolution images at high magnification, but only over a relatively small field size or at relatively low frame counts if scanning over a larger field. Furthermore, such high-resolution imaging tends to require complex equipment and calibration procedures that further impose practical limits on the field, resolution, and speed tradeoff.

However, much of the information in any single image (let alone a sequence of images) is redundant, and therefore, one can design compressive imaging modalities to truly push these limits by leveraging computational analysis.

Here, we demonstrate a novel technique for reconstructing high-resolution, wide-field images at the diffraction limit through intentional use of motion blur. Whereas motion during image acquisition is often considered detrimental, we show that structured motion enables wide-field imaging at the diffraction limit in cases that are directly relevant to materials characterization and large-scale sensing. Motion during image acquisition embeds sub-pixel spatial information into images, which in turn can be readily recovered using sparse image priors well matched to natural images. We also demonstrate experimental designs that eliminate ambiguity to enable high-fidelity reconstruction without priors.

Recent Related Work

- [1] G. Litterio, J.-D. Lizarazo-Ferro, P. Felzenszwalb, and R. Zia, "Super-Resolution with Structured Motion," 2025 IEEE International Conference on Computational Photography, pp. 1-13, doi: [10.1109/ICCP64821.2025.11143835](https://doi.org/10.1109/ICCP64821.2025.11143835).
- [2] D. Fu, G. Litterio, P. Felzenszwalb, and R. Zia, "Multiscale Super Resolution without Image Priors," arXiv Preprint (2026), doi: [10.48550/arXiv.2604.21810](https://doi.org/10.48550/arXiv.2604.21810)

Biography:

Rashid Zia is a Professor of Engineering & Physics at Brown University. From 2018 to 2025, Rashid served as the Dean of the College at Brown University, and this past year, he has been a Visiting Professor at Keio University in Tokyo, Japan. Prior to joining the faculty at Brown University in 2006, Rashid earned his Ph.D in Electrical Engineering at Stanford University where he was the first graduate from the lab of Professor Mark L. Brongersma.

His research group works at the interface of electrical engineering, materials science, optical physics, and physical chemistry to study the interaction of light and matter. For this work, he has received a National Science Foundation CAREER Award and a Presidential Early Career Award for Scientists and Engineers (PECASE), the highest honor bestowed by the United States government for young researchers. He is an Optica Fellow, and successfully served as the lead investigator for the Air Force's Quantum Metaphotonics & Metamaterials MURI program, a large-scale six-year program that brought together leading research groups from Brown, Caltech, MIT, Penn, Stanford, UC Berkeley, and UT Austin. His current research focuses on the integration of computational and experimental science for applications from imaging science to urban economics.

ALL INTERESTED ARE WELCOME

For further information, please contact Professor X.B. Yin at 3910 2659.