Microcrystal electron diffraction (MicroED) has recently emerged as a promising method for macromolecular structure determination. The method complements existing structural biology methods by providing the opportunities to study small macromolecular structures (i.e. <50 kDa) from crystals too small for conventional single crystal X-ray diffraction. Since 2019, we have solved two novel protein structures by MicroED and shown that it was feasible to use MicroED for structure-based drug discovery. However, comparing to X-ray diffraction, MicroED is still in its infancy. Further optimization and innovations in new software and hardware are required to make MicroED more robust and more accessible to the structural biology community.

At the 26th IUCr Congress, I will present our latest developments in specimen preparation, data collection and processing routine, examples of macromolecular crystal structure determination by MicroED, ongoing method development and future perspective of MicroED.

**Figure 1 - A summary of recent results.**

1. a) A rare lysozyme polymorph and data analysis.[1]
2. b) A new R2lox protein structure.[2]
3. c) Visualizing drug binding interactions.[3]
4. d) MyD88TIR domain.[4]
5. e) Optimizing crystals for MicroED allowing high resolution structure determination,
6. f) specimen preparation method – Preassis.[5]