

Assistant Professor Mohammed Kaplan

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Mohammed Kaplan completed his PhD in Biochemistry and Molecular Biophysics at Utrecht University with Marc Baldus (2015). He then did a postdoctoral stint at Caltech with Grant Jensen where he used cryo-electron tomography (cryo-ET) to study the assembly, disassembly, and function of macromolecular complexes under native conditions in hydrated-frozen cells. Mohammed then moved to the University of Chicago in 2023, where he is



currently an assistant professor in the Department of Microbiology and the Department of Biochemistry and Molecular Biology. His research group applies cryo-ET, in combination of cryo-focused ion beam milling and cryo-light microscopy to study macromolecular complexes and organelles directly inside cells. He was recently selected as a Searle Scholar (2025).

In situ structural biology using cryo-electron tomography.

Electron cryo-tomography (cryo-ET) is a technique that allows the investigation of intact macromolecular complexes while they are in their cellular milieu. Over the years, cryo-ET has had a huge impact on our understanding of how large biomolecular complexes look like, how they assemble, disassemble, function, and evolve(d). Recent hardware and software developments and combining cryo-ET with other techniques, e.g., focused ion beam milling (FIB-milling) and cryo-light microscopy, has extended the realm of cryo-ET to include transient molecular complexes embedded deep in thick samples (like eukaryotic cells) and enhanced the resolution of structures obtained by cryo-ET. In his talk, Mohammed will present his previous work on bacterial flagellar motors and microbial predation, and finally, he will discuss current ongoing work in the lab encompassing both prokaryotic and eukaryotic systems.