Repositioning Small-Molecule Crystallography to Educate Next Generation of Users

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One of the main educational missions of the X-ray diffraction facility is to make sure that chemistry students can engage with chemical crystallography concepts and develop the skill sets they need to use crystallography effectively in their future research. To make small-molecule crystallography an accessible technique for chemistry students of all levels, we have incorporated crystallography laboratory practice into various undergraduate experimental chemistry courses, as well as for outreach programs such as inter-institutional visits.[1-6] We have further re-designed our crystallography course and provided different learning paths to help students transfer what they learn to their research projects.[6-9] We also hold a variety of student-centered guest lectures and organize field trips to the national lab, providing students opportunities to learn about additional advanced crystallography experiments directly from the experts in the field.[10,11] Thanks to their achievement, some of these students have been awarded crystallography scholarships.[8] Many of them keep employing small-molecule crystallography after they start their independent research career, and make important contributions to the field.[10]Small-molecule crystallography is the widely expanding and dynamic experimental science that develops our abilities to extract structural information using crystallographic techniques. Modern chemical crystallographers should include both expert crystallographers and amateur crystallographers,[12] the latter encompassing chemistry researchers who use small-molecule crystallography in their own scientific study. To educate the next generation of users, we should reposition small-molecule crystallography,[8] go beyond "the push of a button", emphasize basic but important concepts, provide different learning paths, and ensure students who would like to learn crystallography can develop the necessary skill sets to employ small-molecule crystallography in their future research.[6-11]

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