Crystallography Hic et Nunc

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This talk will describe the current state of crystallographic science and new pedagogy made possible by Web 3.0. In the last fifteen years, academic crystallography has largely migrated from a research specialty to a technique employed by a broad user community. Yet, the knowledge gained from analysis of its structures is a key underpinning of modern science and technology. Crystallography has gained importance for researchers in disciplines where it has not previously appeared, such as engineering and solar energy technology. Technical advances, however, now enable users with little or no training, or deeper understanding, to often but not always produce quality results, as revealed by recent high profile and embarrassing retractions in the peer reviewed literature, many the result of pathological science or inadequate review. The absence of crystallography in many curricula has led to growth of and dependence on independently funded workshops and summer schools, as well as other, non-traditional curricular resources for crystallography instruction, such as Web pages and online courses, which allow crystallography to be self-taught. Implementing modern Web technologies with sound pedagogy requires skilful integration of relevant, often disparate resources into useful and usable frameworks, enabling learners to interact, explore new situations, and use scientific reasoning skills such as hypothesis testing and model-based reasoning. The evident disproportion in implementing contemporary technologies into our global crystallography education resources requires that we shift our focus from simply imparting content knowledge to empowering students with the fundamental processes and skills needed for on-demand learning and practice in crystallography.