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FACULTÉ DES SCIENCES

Département de chimie minérale
et analytique

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Auditoire A50B - Sciences II

**Vidéo conférence - <https://unige.zoom.us/j/7885492688>
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Understanding metalloenzyme mechanisms for biotechnological application

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While essential for the global human population, centralized industrial processes such as dihydrogen (H_2) and ammonia (NH_3) production are among the largest emitters of carbon dioxide (CO_2). For example, industrial NH_3 production by the Haber-Bosch process consumes 1-2% of global energy and is responsible for 3% of CO_2 emissions (including CO_2 from H_2 production), surpassing global aviation emissions. Metalloenzymes that catalyze reactions such as H_2 production, dinitrogen fixation and CO_2 reduction are of interest for deployment in new biotechnologies aimed at improving environmental sustainability by decentralizing key global industrial processes. Further, they provide inspiration for new synthetic catalysts. However, the electron transfer and catalytic mechanisms of metalloenzymes catalyzing these reactions are not fully understood, which precludes their biotechnological and bioinspirational exploitation.

This seminar will detail the recent efforts of the Milton group to understand the electron transfer and catalytic mechanisms of primarily hydrogenases and nitrogenases, as well as an analogous metalloenzyme involved in chlorophyll biosynthesis. A combination of experimental approaches including electrochemistry, bioinorganic chemistry and protein chemistry/chemical biology principles will be outlined.

