**From Basic Biology and Bioinformatics to Drug Discovery:**

**Innovation and Entrepreneurship in the Research Eco-System**

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Knowledge derived from genome sequences of humans and pathogens has the potential to accelerate diagnosis, prognosis and cure of disease. We are moving quickly into an era of precision medicine, not only in familial diseases where a mutation in a human gene is important, but also for understanding somatic mutations in cancer. Equally important, the genome sequences of pathogens, for example in tuberculosis or leprosy, can give clues about the choice of existing drugs, repurposing of others, and the design of new ones to combat the increasing occurrence of drug resistance. I will discuss progress using structure-guided approaches for targets in cancer developed in Astex, the company I cofounded with Harren Jhoti and Chris Abell in 1999, and which has two cancer drugs on the market and several under development. I will also review the targeting of mycobacterial infections in tuberculosis, leprosy and cystic fibrosis, which require more activity in academia, given the difficulty in making significant financial returns on drug sales for these diseases, which are more prevalent in developing countries, or affect genetic diseases like cystic fibrosis where the market is relatively small. I will discuss new techniques in machine learning that have revolutionized our computational approaches and cryo-EM our experimental work, demonstrating how innovation can arise in all parts of the ecosystem involving academia and industry.