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Biophysics in an age of convergence: Challenges and prospects

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Biophysics is a highly interdisciplinary science that uses the tools and methods of the physical sciences to study biological systems. On all levels of hierarchy, whether investigating single biomolecules and their interactions on the nanoscale, where all the natural sciences converge to one, or cells, or organisms, or the interaction of organisms, or the interaction of organisms with the environment, biophysicists encounter beauty and expediency in the natural materials, structures and processes.

We currently live in interesting times: the tremendous amount of specialist knowledge that is generated and published in various fields is getting out of hand. Too many papers are published, in too much of a specialist jargon, to be of help to substantially advance human society. Biophysicists, on the other hand, collaborate on a daily basis with biologists, physicists, chemists, engineers and theoreticians and know the different inherent cultures and communication protocols in the respective fields – they therefore are good candidates to come up with a science language based on deep understanding; a science language that is compatible across fields and levels of education, and that furthermore aids transfer of scientific results to useful, sustainable applications - such as how to address increasing water and food challenges (concerning supply, quality, yield, shelf life), or how to provide living space for a growing population.

The presentation will deal with biophysical approaches in contributing to successfully address these challenges, and outline opportunities that arise from the methodology. Based on detailed examples, promising ways forward will be presented in this 2012 Wilhelm Röntgen Lecture.