PLENARY PRESENTATION

LEARNING FROM DIATOMS: BIOMIMETIC APPROACHES

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We live in interesting times. Biology has changed from being very descriptive to a science that can be acknowledged and understood (in terms of concepts) by researchers coming from “hard sciences” such as chemistry, physics, mathematics and engineering. The “hard sciences” rely on experimental, empirical, quantifiable data or the scientific method, and focus on accuracy and objectivity. The amount of causal laws in the new biology (indicated by the ratio of causal versus descriptive knowledge) is steadily growing. Additionally, a new field that can be called “Biological Physics” is currently emerging. The languages of the various fields of science increasingly get compatible, and the amount of collaborations and joint research projects between researchers coming from the “hard sciences” and biologists has grown tremendously over the last years. Diatom biomimetics, i.e., technology transfer from diatom research to engineering, is especially promising. Biomimetics is a growing field that has the potential to drive major technical advances. It might substantially support successful mastering of current challenges for humankind. Various examples will be given to illustrate these points, including a novel micropump inspired by chain-forming diatoms, diatom hinges and interlocking devices as inspiration for emerging three-dimensional micro-electro-mechanical systems and diatom spores and resting stages as inspiration for architecture.

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