

## **Fluid systems in insect physiology**

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Physiology of small animals consists of complex micro-and-nano fluid systems. In insects, there are three basic fluid systems that are somewhat independent: respiratory, digestive and circulation. In addition, there are many instances of additional complex fluid systems that are related to other aspects of the insect's life, for example, defense systems, and ontogeny. Unlike most synthetic micro/nano fluidic systems, the fluid systems in an insect typically consist of soft pliable tubes, and, in the case of respiratory systems, can have very large dynamic ranges (eg; at rest versus in flight). Aside from the academic interest, these systems are promising from a biomimetics point of view. X-ray phase-contrast imaging has provided an unprecedented look into the dynamics of these systems. In this talk, a summary of the current capabilities will be presented, followed by a discussion of the challenges and possible future directions.