**Dario Floreano** **LIS-I2S-STI-EPFL** **http://lis.epfl.ch**

**Course: Bio-inspired Adaptive Machines**

Mini-project: Evolution of morphology 4 (small and fast)

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## Materials

To perform this assignment you need:

- Framstick version 2.4
- A PC running Windows and equipped with a good video board as well a fast processor.

## Assignment

Artificial evolution is driven by a fitness function. The way of defining a fitness function has a strong influence on the evolutionary process and can radically change the results of an evolutionary process. The goal of this assignment is to understand how fitness can be set and which effects can be observed by defining the same goal with different fitnesses.

### Goal

We want to obtain a creature that moves fast with a body as small as possible.

**Question 1.**
Describe and comment at least three strategies (not values) to define the goal mentioned above using the parameters of the fitness function given by FRAMSTICKS. One of the three strategies can be based on a fitness function that cannot be implemented in FRAMSTICKS but would be interesting (please indicate the features that should be added in FRAMSTICKS to achieve your idea).

**Question 2.**
Choose two of the three strategies given under question 1 and test them using the simulator. Perform at least 100 mio steps. Then answer the following questions:

- **2.1** Describe and comment your simulation setup (parameters different from standard values).
- **2.2** Describe and comment the results.
- **2.3** How did you choose the numeric parameters of the fitness function? Did you change them during the simulation? How and why?