

- Experimental

- Experimental skills
- Basic knowledge of C++/Python/MatLab
- Knowledge of 3D designing/printing techniques
- Basic knowledge of Arduino
- Basic knowledge of digital image processing



QR code
zum pdf der Ausschreibung

For further information
please contact:

Harol Torres / Ali Shakeri
Institute for Multiscale Simulation
(MSS)
Department of Chemical and
Biological Engineering (CBI)
Cauerstrasse 3, IZNF,
91058 Erlangen,
Room 03.157 / 03.155
email: harol.torres@fau.de /
ali.shakeri@fau.de
web: www.mss.cbi.fau.de

Granular Swimmer

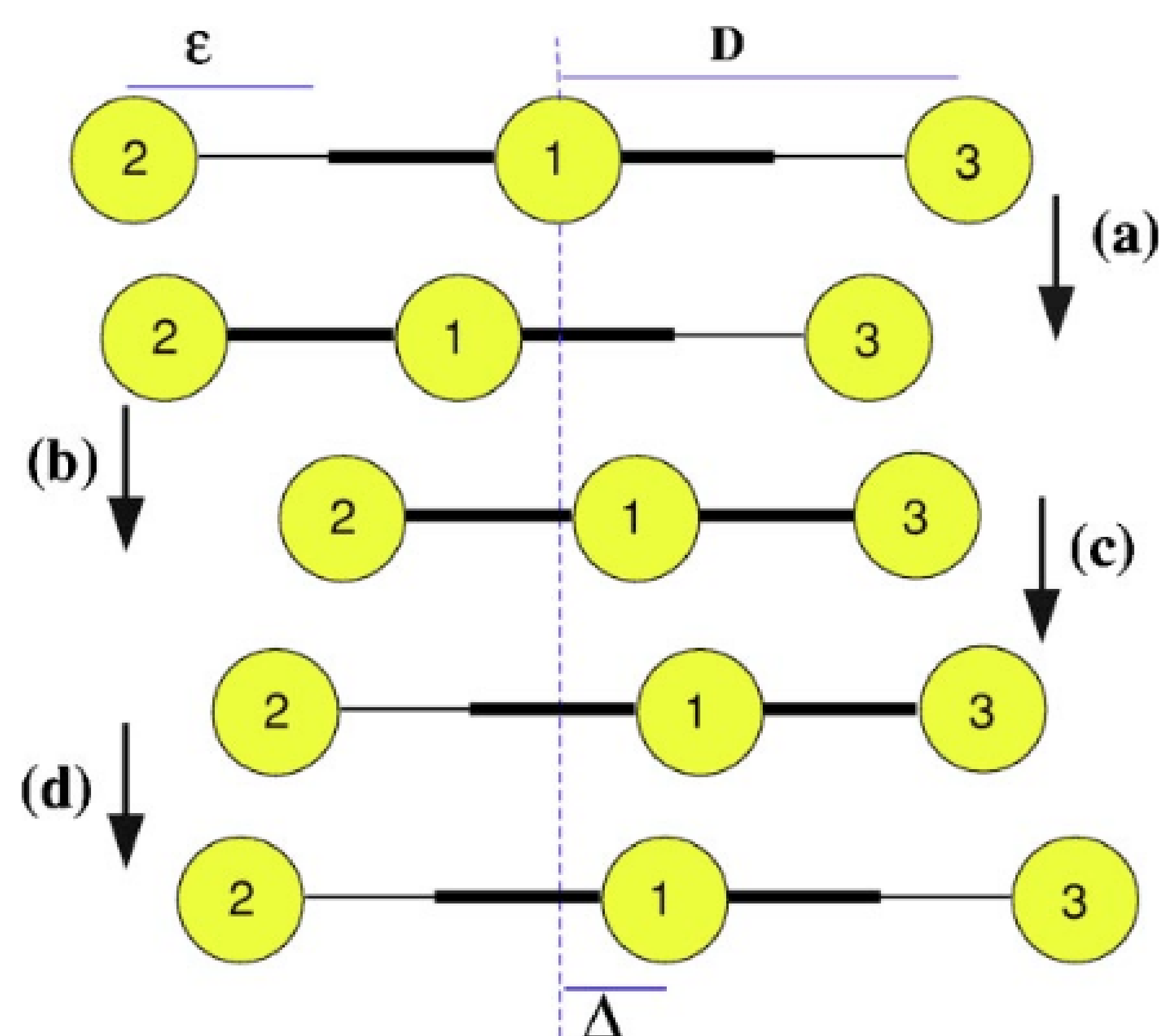
Exploring worlds beneath the earth

Three-linked sphere Swimmer

Background

Many observations in nature suggest that the dynamics of dense granular systems might be similar to the viscous fluid flow. The undulatory movement of sandfish [1] and shovel-nosed snake [2] under the sand resembles the nonreciprocal movement of microorganisms in low Reynolds number regime.

In this study, we will design a three linked sphere (nonreciprocal) swimmer to further explore mechanisms of locomotion in granular systems.



Aim

Understanding the mechanisms of swimming in granular material opens a new door for engineers and scientists to further explore the life beneath the earth. We will investigate experimentally the mechanisms of locomotion of a robot that swims inside a granular material. Our goals are as follows:

- Design a three linked sphere robot (see image)
- Realise experiments to study the efficiency of the robot and compare it with others
- Study the effect of size and shape of grains on the movement
- Are the nonreciprocal swimmers more efficient than reciprocal ones?

[1] <https://youtu.be/wscvn0QI-xg>

[2] https://youtu.be/FG47_2r8LuE