

Searching HiWis, SHKs or
WIR BRAUCHEN HIWIs!

```

H H I W W I SSS
H H I W W I S
HHH I W W W I SSS
H H I W W W I S
H H I W W I SSS

```

Evolving developmental programs for computing artificial neural networks.

Intro:

- * www.neu-n.eu, unconventional computation
- We are building artificial chemical neurons that should self-assemble and compute. Lipid droplets are filled with an excitable chemical medium, allowing the propagation of signals through droplet networks.
- * (Evolutionary) Developmental Systems, self-assembling systems
- * evolutionary algorithms, optimizers

Steps to do

- * build / modify an evolutionary algorithm in Java or C++
(Gabi Escuela already has something and there are many EA libraries or you write your own software)
- The EA Libraries should offer the possibility to plug in arbitrary digital genotypes and arbitrary genetic operators: recombination, mutation, selection and evaluation of an objective function
- Help us develop the genetic operators for the system
- * dock into SRSim
(spatial and Rule-based 3d simulator for the self assembly)
- modify configuration files
- send jobs to our queueing system
- collect finished jobs
- * dock into DropSim (non-spatial, event-based simulator for the propagation of droplet excitations)
- write interface between 'SRSim' and 'dropSim'
- > Allows evaluate of an objective function

Expectations / Whe we are doing this:

- * Allows the comparison of the developmental rules that are evolved to developmental rules that are designed/engineered by humans
- * Learn / generate new engineering concepts -> how to build "developmental programs"
- * create artificial organisms with self-x properties
 - regenerative, robust, error-tolerant, ...
- * automated problem solving...

Requirements:

- * Outstanding mathematical and programming skills
 - C++, Java, Perl, etc...
- * Good knowledge of simulation software
- * Ideally some experience with cluster computing, batch systems
- * Familiarity with linux environments
- * Ability to work independently; be creative

Contact us:

Gabi Escuela, gabi.escuela@uni-jena.de, R 3430, 03641-946461
Gerd Grünert, gerd.gruenert@uni-jena.de, R 3430, 03641-946461
Peter Dittrich, peter.dittrich@uni-jena.de, R3401

Work in a young, international, creative, interdisciplinary team

- * try working in science ;-)
- * money