New Directions in Biocomputation

Program

September 12
8:30 – 9:30 Arrivals, registration (coffee available)
9.30 – 9:45 Welcome: Stefan Diez (B CUBE, TU Dresden) and Heiner Linke (Heiner Linke, NanoLund and Lund University, Coordinator of Bio4Comp)

Alternative parallel computation
10:15 – 10:45 Eric Lutz (Univ. Erlangen-Nürnberg): The physics of information: from Maxwell’s demon to Landauer
10:45 – 11:00 Coffee

Network-based biocomputation (NBC)
11.00 – 11:35 Dan Nicolau Jr (Molecular Sense, Oxford): Network-based biocomputation (NBC): mathematical basis and vision
11:35 – 12:10 Heiner Linke (Heiner Linke, NanoLund and Lund University, Coordinator of Bio4Comp): Status and technological challenges of NBC
12.10 – 12.30 Dan Nicolau Sr. (McGill, Montreal) Bacteria for network-based biocomputation
12:30 – 13:30 Lunch

Biological tools for computation
13:30 – 14:00 Zev Bryant (Stanford University): Engineering controllable biomolecular motors
14.00 – 14.30 Beáta Bugyi (University of Pécs): Activities of actin-binding proteins: principles and approaches
14.30 – 14:45 Günther Woehlke (TU Munich): Microtubule severing proteins
14:45 – 15:00 Coffee
15:00 – 16:30 Parallel workshops
(1) Biological agents and micro/nanofluidics: tagging and agent multiplication
(2) Architectural elements: tunnels, detectors, and gates
(3) Networks and real-life applications
16:30 – 17:00 Plenary session – conclusions from workshops
17:00 Poster session
18:30 Dinner
21:00 – 22:00 Announcement of the first Bio4Comp Award and get together
September 13
8:45 – 9:00 Coffee

Nanotools for biocomputation
9.00 – 9.30 Irene Fernandez-Cuesta (Univ. Hamburg): DNA Optical mapping: labelling and reading single molecules
9.30 – 10.00 Adam Micolich (UNSW, Sydney) Nanowire-based field-effect transistors for single-molecule detection
10.00 – 10:15 Santiago Muiños Landin (Univ. Leipzig): Reinforcement learning of Artificial Microswimmers
10.15 – 10:30 Coffee

Applications and theory of biocomputation
10.30 – 11.00 Francis Woodhouse (Univ. Cambridge): Active matter logic
11.00 – 11.30 Boyan Yordanov (Microsoft Research): topic: modelling and analysing biological systems and biological computation
11.30 – 11.50 Benjamin Friedrich (TU Dresden): Percolation in time-varying networks using renormalization group theory
11.50 – 12.10 JunKyu Lee (Queen’s University of Belfast): Transprecision Computing Towards Energy Saving
12.30 – 12.45 Conclusions and next steps: Heiner Linke (Lund University)
12:45 – 14:00 Lunch and get together

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