**Syllabus**

***Week 1*** will consist of an intensive series of lectures and laboratories introducing fundamental ideas and tools of complex systems research. The topics will include non-linear dynamics and pattern formation, statistical mechanics and stochastic processes, information theory and computation theory, adaptive computation, computer modeling tools, and specific applications of these core topics to various disciplines.

***Weeks 2 and 3*** will consist of lectures and panel discussions on current research in complex systems. The topics are:

|  |  |
| --- | --- |
|  | 1. Non-standard Approaches to Computation |
|  | 2. Origin and Early Evolution of Life |
|  | 3. Self-Organization and Collective Behavior |

***Week 4*** will be devoted to completion and presentation of student projects.

**Mathematics Review:**András Kroó, Alfréd Rényi Institute of Mathematics, Hungarian Academy of Sciences, Hungary

**Nonlinear Dynamics and Pattern Formation**:
 Zoltán Rácz, Eötvös Loránd University, Hungary

**Statistical Physics and Stochastic Processes**:
Mark Newman, Santa Fe Institute and Imre Kondor, Eötvös Loránd University, Hungary

**Information Theory and Measures of Complexity**:
 Melanie Mitchell, Santa Fe Institute, USA

**Theory of Computation**:
Cristopher Moore, University of New Mexico, USA

**Adaptive Computation**:
 Melanie Mitchell, Santa Fe Institute, USA

**Nonstandard Approaches to Computation:**Patrick Hayden, University of Oxford, UK
Grzegorz Rozenberg, Leiden University, The Netherlands
Hava Sieglemann, Technion, Israel

**Origin and Early Evolution of Life:**Erik Schultes, Massachusetts Institute of Technology, USA
Peter Schuster, University of Vienna, Austria
Eörs Szathmáry, Eötvös Loránd University, Hungary

**Self-Organization and Collective Behavior:**Imre Kondor, Eötvös Loránd University, Hungary
Gábor Vattay, Eötvös Loránd University, Hungary
Tamás Vicsek, Eötvös Loránd University, Hungary