

## **Does Evolution Work? Mathematical Models Show Its Possibilities and Limitations**

In evolution theory it is generally claimed that many small changes lead to big ones. Is this really the case? Evolutionary biologists know it is by far not as simple as school textbooks teach. In fact the final proof that evolutionary mechanisms can create complex new structures is still missing 157 years after Charles Darwin published his famous book *Origin of Species*. Also, mathematical models seem to indicate the opposite: many small changes lead to the optimization of existing structures, but do not lead to more complex ones. In other words, microevolution works, macroevolution doesn't. In this workshop mathematical evolutionary models that are used to solve complex real-life problems will be introduced and used to demonstrate limitations. This is not a workshop for mathematicians, but for interested laymen, and it will include helpful and fascinating graphic models.

**Peter Korevaar** studied physics and astronomy at the University of Utrecht, Netherlands. In 1989, he acquired his PhD in astronomy on the topic of "Time-dependent models of stellar coronae". After two years at the University of Heidelberg, Germany, in 1991 Peter accepted a position at IBM. Since then he has worked as consultant in the areas of logistics, optimization, and analytics, mainly for automotive companies. For many years Peter was the leader of the Physics and Astronomy Group of the German Creationist Society "Wort und Wissen". Currently he is a member of the board of this society. Peter and his wife Heleen live in Germany near Heidelberg. They have five children and are members of a free evangelical church.

### I. Mathematical Optimization – A brief overview

#### A. What is Mathematical Optimization?

#### B. Examples for Mathematical Optimization

### II. The amazing power of Evolutionary Algorithms

#### A. What are Evolutionary Algorithms?

#### B. Examples for Evolutionary Algorithms

### III. What we can learn from Evolutionary Algorithms

#### A. What is the role of blind randomness in Evolutionary Algorithms?

B. Can Evolutionary Algorithms work without Intelligence?

C. Comparison between Evolutionary Algorithms and Biological Evolution

IV. Conclusions