

University of St Andrews  
School of Mathematical and Computational Sciences

**Computer Science Division**

**Annual Open Lecture Course 1996**

# **Genetic Algorithms**

*Tuesday 16th and Wednesday 17th April 1996*

*(starting at **11.00** a.m. on Tuesday and 10.30 a.m. on Wednesday)*

## **Speakers:**

Dr Peter Ross  
Department of Artificial Intelligence  
University of Edinburgh

Dr Colin Reeves  
School of Mathematical and Information Sciences  
University of Coventry

## *The Speakers*

Dr Peter Ross was originally a mathematician but joined the Department of AI at the University of Edinburgh in 1978, where he is now a senior lecturer. His research interests include genetic algorithms and neural nets (separately and together) and he heads a very active group researching a broad range of topics in evolutionary computation. He is the author of four books and many papers, and is also the current chairman of SSAISB, the UK's AI society. Dr Cohn Reeves is a senior lecturer in Operational Research in the School of Mathematical and Information Sciences at Coventry University. His main research interests have been in applications of neural networks to pattern recognition problems, and in heuristic methods for combinatorial optimization (particularly genetic algorithms) on which he has published several papers. He was joint program-chair of the 1993 International Conference on Artificial Neural Networks and Genetic Algorithms, and has participated in many international events on these topics. His current research focuses on non-biological perspectives on genetic algorithms.

## *The Course*

Genetic algorithms have stimulated great interest recently, and are the subject of much research activity. Genetic algorithms arose out of work by Holland on the behaviour of evolutionary systems, and they represent the application of these ideas to optimisation problems whereby solutions are “evolved” computationally. Research is particularly concerned with the convergence characteristics of genetic algorithms, and studies the impact on convergence of design issues such as the genetic “operator&” that effect the evolution, the problem space representation, population sizes and breeding policies.

## *Venue*

All lectures will be held in Lecture Theatre C in the Mathematics Institute, University of St Andrews.

Teas/coffees will be served in one of our new laboratories (The Philip Lee Laboratory), which is situated at the back of the building, straight down the corridor from the main door.

# *Programme*

## **Tuesday, 16th April**

- 10.30-11.00      *Registration & Coffee (in Philip Lee Laboratory)*
- 11.00-12.30      GA basics: simple population genetics, genetic operators (crossover, etc), fitness, selection  
GA options: different selection methods, operators, codings, replacement strategies etc. Dr  
Peter Ross
- 12.30-14.00      *Lunch*
- 14.00-15.30      GA theory: schemata, deception, Walsh functions and experimental design, epistasis,  
Markov model GA applications: representations, forma analysis (examples for continuous,  
discrete and sequence-coded functions).  
Dr Colin Reeves
- 15.30-15.45      *Tea/coffee*
- 15.45-16.45      Research Topics I: examples of other non-binary encodings, such as applications to neural  
nets and facility layout and genetic programming.  
Dr Peter Ross

## **Wednesday, 17th April**

- 10.30-12.00      Research Topics II: epistasis analysis and connections to statistics.  
Dr Colin Reeves
- 12.00-14.00      *Lunch*
- 14.00-15.30      Research Topics III: examples of applications to scheduling and timetabling.  
Dr Peter Ross
- 15.30-15.45      *Tea/coffee*
- 15.45-16.45      Research Topics IV: links to neighbourhood search and landscape analysis.  
Dr Colin Reeves