GUEST EDITORIAL

Special Section: Evolutionary Design

PETER BENTLEY

Intelligent Systems Group, Department of Computer Science, University College London, Gower Street, London WC1E 6BT, UK

This issue of *AIEDAM* returns for the third time to the subject of evolutionary design. As in the previous two "mini" special issues (Volume 13, Numbers 3 and 5, 1999), this issue contains three papers focussing on the use of evolutionary algorithms to aid designers by automating part of the design process. These papers provide a showcase of the work of some of the original pioneers of this field as they demonstrate that their research is still at the forefront of developments in evolutionary design. As is fitting for this final special issue, the three papers all concentrate on what most designers recognize as the trickiest stage of the design process for computers: nonroutine, conceptual or innovative design.

The first paper, by Dr. Ian Parmee and Dr. C.R. Bonham: *Towards the Support of Innovative Conceptual Design through Interactive Designer/Evolutionary Computing Strategies,* explores how adaptive and evolutionary computation can and should be used for a range of different design problems. Ian describes how such systems can aid the exploration of innovative new solutions by designers. The second paper, *Case-Based Evolutionary Design*, describes the most recent work of Dr. Mike Rosenmen, as he uses a new case-based hierarchical evolutionary approach to allow the generation of novel house plans which are "inspired" by a database of good cases. Professors John Gero and Vladimir Kazakov provide the last paper: *Adaptive Enlargement of State Spaces in Evolutionary Designing*. This highly original paper suggests one way that the constraints of a design representation can be bypassed is to use a generalizing crossover operator, capable of enlarging the search space and thus allowing surprising and creative solutions to be evolved.

Altogether, the nine papers that have appeared in this series of three special issues on evolutionary design provide an exciting snapshot of current work in this area. With evolutionary design now being used for applications as diverse as neural networks, electronic circuits, flywheels, architecture, and even music and art, we are now beginning to realize the full potential of evolutionary computation. Evolution makes our computers creative. With its help, our own technological and creative abilities will continue to increase.