

WCCI'06 Panel Session

A Practical Model for Evolutionary Computation Market Introduction

**An Overview of Strategies Adopted by
Advanced Computational Technologies
(ACT)**

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History

- Researching and working in EC for 20 years
- Carried out first consultancy work in 1991 and continued from an academic base throughout 1990's.
- Commenced operating as ACT outside of academe in 2000 but also continued working full-time in academe.
- Now offer services ranging from relatively fundamental research thru applied / contract research to straight consultancy via the ACDDM Lab (UWE, Bristol) and ACT.

(see www.ad-comtech.ac.uk for details).

Clients / collaborators since 1991 include:

GEC Plessey

Rolls Royce Civil Aircraft

BAE Systems

Lafarge Braas

Perkins Technology

Knight Piesold and Partners

British Energy

GEC Alstom

Chantier de l'Atlantique

Rolls Royce Associates

PricewaterhouseCoopers

North West Development Agency

Evotec

British Telecom

SEA

**All of the following points and comments are
meant to promote discussion**

Why move consultancy activities outside of academe?

- Necessary to be highly responsive, fleet of foot, flexible and agile – not readily identifiable descriptors for most academic institutions;
- Need to take risks – academic institutions can be risk averse or even have a zero risk policy;
- Some academic researchers are not application oriented; some are not business oriented; many have problems with industrial practice and deadlines; Many have problems with the '**KISS**' concept.
- Research software is not production software – academic software developers are not professional software developers.

Why maintain an academic base?

- Still much research to be done – essential to maintain a relatively fundamental research base
- Most work with industry requires a degree of applied research in addition to straight consultancy – such research is best done from an academic base with academic researchers.
- Real complexity lies in real-world problems - Industrial / Commercial problems are a rich source for RC funded fundamental research.
- Both ACT and Industry can benefit greatly from a more fundamental research base which becomes involved **when appropriate**

Academics and Industrialist have very different drivers. Some translation of requirement is required along with an enabling structure to ensure both parties can work well together.

Researchers should research; Systems and software engineers working with the Client should implement.

Long standing EC integration experience across multiple disciplines helps greatly with good communication between all parties at all times an essential aspect.

Overall ACT Strategy

- Rapid identification of problem characteristics in terms of research, application and implementation requirements
- Determine what can be done immediately (i.e. consultancy); what requires an element of contract / applied research; what may require more fundamental research;
- Discuss situation with client, determine to what extent they wish to proceed and apportion work appropriately between the academic and consultancy environments.

Continue to develop a cyclic process where straight consultancy feeds into applied research from which we can spin off more fundamental research which subsequently contributes to our knowledge base and overall application capability.

Good communication is necessary but do not allow any one part of this process to interfere with the others except in a contributory manner.

Much consultancy fails to deliver or disappoints due to being run from an academic base.

Conversely many industrial in-house EC application fails to deliver or disappoints due to a lack of fundamental knowledge and / or application experience.

This contributes to continuing slow penetration of EC into industry.

Conduit required to provide a two-way exchange of knowledge / experience relating to application and implementation which involves several disciplines / sets of skills / people with differing attitudes and working practices. EC is not a stand-alone technology – it can achieve far more in an appropriate technical and user-centred environment

ACT provides such a conduit and the development of the right environment.

It is a mistake to concentrate solely on optimisation – a flexible approach to EC application and integration significantly broadens potential application area.

Optimisation is a niche area

The term 'optimisation' can turn many industrialists off.

Broaden your horizons – be creative – open up new areas.

EC has a far greater potential to support multiple activities.

What percentage of EC researchers really want to become involved with industry?

Many want complex but well-defined industrial problems handed to them in order to test and compare their algorithms

- but few are willing to get their hands dirty??

Initially, well-defined industrial problems that can handle EC do not exist!

The first task of any EC practitioner is to develop, with the client, the industrial problem representations so that they can be successfully manipulated by EC algorithms. This represents a significant investment of time.

Comments?

Questions?