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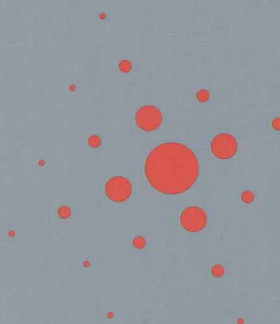


4th international conference
of the European society for precision engineering and nanotechnology
May 31st – June 2nd 2004 Scottish Exhibition & Conference Centre, Glasgow, Scotland

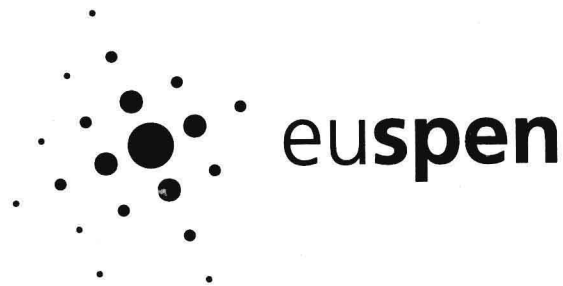
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nanotechnology

May 31st- June 2nd 2004

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Foreword

Micro and nano technologies are advancing rapidly into our everyday lives, increasing our prosperity, our health, our environment and our quality of life. The technology requirements for making very accurate and very small products raises a host of novel scientific and technical problems which cut across many different disciplines. This in turn drives the need for effective interdisciplinary research and collaboration to address these challenges. These technological issues and their possible solutions will be comprehensively addressed at this 4th International Conference of the European Society for Precision Engineering and Nanotechnology, **euspen**.

euspen links industrialists to researchers across 31 countries in an influential and extended network of people involved in the development, application and commercialisation of these ultra-precision engineering technologies. The 7 technical sessions of the society's 2004 international conference will cover new developments and market forces in process technologies, machine tools/instruments and metrology in the ultra-precision, micro and nano engineering sectors, in particular: MEMS design, fabrication and markets; non-contact microfabrication processes and novel materials; contact microfabrication processes and assembly; nano/precision manufacturing processes and systems; nanometrology, positioning and sensors; ultra precision measurements, machines and control systems. We have received more than 260 abstracts from 24 countries and the conference contributions have been selected by an international board for oral or poster presentations. All presented papers have been collated in these proceedings.

We thank our colleagues on the international and local organising committees for all their help and assistance. We also thank our sponsors at the Department of Trade and Industry, Moore Tool Company, Glasgow City Council and Cranfield University for their support for the conference. We would also especially like to thank Heidenhain GmbH for their provision of the student and Eastern European academic scholarships.

It gives me great pleasure, on behalf of the **euspen** council, to welcome you to the 4th International Conference at the Scottish Exhibition and Conference Centre (SECC), Glasgow, one of Europe's finest and most technically advanced conference venues. We look forward to meeting with you in a stimulating and interesting environment, where old acquaintances can be renewed, new ones made and where new ideas and new collaborations will be conceived.

Glasgow May 2004

Paul Atherton
euspen President

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Session 1

MEMs Design, Fabrication and Market Review

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