



The 4M Network of Excellence has created a Knowledge Community in Multi-Material Micro Manufacture, comprising over 150 researchers from 30 partner institutions in 15 European countries, including Bulgaria, Hungary, Slovenia and Romania. Funded by the EC, the Network has brought together expertise in Micro- and Nano- Technology (MNT) for the batch-manufacture of microcomponents and devices in a variety of materials for future microsystems products and acts as a knowledge resource to both the research community and industry in the development of microsystems devices that provide increased functionality in tiny packages, integrating micro and nano scale features and properties into products and systems.

Since its launch in October 2004 the Network has, through its joint programme of activities, encouraged Partners to work collaboratively, taking advantage of the range expertise and equipment available across the Network. Partners have integrated their research into eight 4M Divisions. Five are Technology Divisions, three based on materials processing: Polymers, Metals and Ceramics, and two based on process technologies: Metrology and Assembly & Packaging. These are complemented by three Applications Divisions: Micro-optics, Micro-fluidics and Micro-sensors & Actuators. Each Division, with its own appointed leader and management board, have covered specific topics of research and development, and have been free to choose their own method of operation, organising their own workshops, training and initiating partner exchanges. The deliverables produced by the Divisions were described as being "of a high quality" at the last project review. In addition to this Divisional working, in order to encourage further collaboration and integration and ensuring common research topics were addressed across the divisions, a series of competitive internal calls for cross-divisional project proposals have been held. In the first three years of the network competitive internal calls led to 19 projects being funded and completed and are considered to have been a great success.

The work carried out in both the Divisions and in the cross-divisional projects was recently described by the project reviewer as "of high quality and relevance to industry".

In Year 3 the 4M Network held its first 4M Summer School, hosted by the Department of Manufacturing Engineering and Management (IPL), at the Technical University of Denmark (DTU) in Lyngby, Denmark. The school (sponsored by SARIX and by ESPRIT) was considered to be a great success and is being held again in 2008. At these schools participants are led through the various stages of developing and manufacturing a micro device, giving the attendees an overview of the complete product development process, from a list of requirements and technology possibilities through to manufacturing, characterisation and testing.

Another major achievement of the Network, and one that has played a major role in the dissemination of our work, has been the now well established annual 4M Conference. Following on from the successful conferences in 2005 and 2006 which were held in Germany and



France respectively, the third conference 4M2007 was held in Bulgaria. 4M2007 was held in the mountain resort of Borovets in Bulgaria, and attracted some 120 delegates. Six fascinating addresses were delivered by the invited speakers to the interested and knowledgeable audience of over 120 attendees. These were complemented by the papers selected for oral presentation in the thematic sessions. A well-presented poster session gave everyone further opportunity to network and discuss each other's work. In total

84 papers were accepted for publication in the proceedings which were published by Whittles Publishing in time for the conference. The fourth conference will be held in Cardiff, UK, from 9th - 11th September 2008 and will be the last conference held during the funded life of the project. However there are already plans to continue the 4M series of conferences with a suitable venue for 4M2009 currently being sought.

A series of Special Issues have arisen from these conferences which have further disseminated the work of the Network and raised its profile before a wider audience.

Working together in the 4M Network an awareness of the skills and expertise of fellow partners has gradually been built up, along with a perhaps even more valuable commodity-

trust- which is a very important prerequisite for achieving a sustainable integration. Partners report that this has been the principal benefit arising from their participation in 4M.

This is also the aspect that the Partners themselves would like to preserve after the funded period of the Network. In fact the partners see great potential in enjoying the benefits of the Network without having to fulfil the negative aspects (reporting, performance indicators, deliverables etc) associated with any funded project. With this in mind it is proposed to establish a 4M Association.

The 4M Network of Excellence believes that by setting up such an Association the relationships formed during the lifetime of the NoE will be converted into a durable and sustainable format, creating an open and permanent forum for the knowledge community, allowing it to grow, spreading the benefits of membership to a wider micro and nano manufacturing constituency than the current 4M NoE, as future membership will be open to all.

Consequently in Year 3 and continuing into Year 4, there has been much debate about what the 4M Association should offer in order to achieve its goal of

being sustainable through the collection of membership fees. This has not only been a debate amongst Partners, for the coordinator has also conducted an online survey of its industrial Affiliates in which they were invited to rank a list of proposed services. This was an interesting exercise, as a result of which an initial offering of the 4M Association has been arrived at and will include the following:

- ♦ **networking** (local/regional/technical contact groups /clusters);
- ♦ **an interface between research community & industry;**
- ♦ **joint working/interest groups** addressing specific, but common, topics;
- ♦ **brokerage service** offering access to the expert design, prototype and manufacturing services of the other member organisations;
- ♦ **new business opportunities** via contacts among membership
- ♦ **consortium building for industry-led joint projects** in emerging research areas in order to bid jointly for EC, national and industrial funding;
- ♦ **access to 4M research infrastructure** and knowledge (4M Knowledge repository)
- ♦ **an annual 4M Conference**

If you wish to know more about the 4M Association please visit: www.4m-net.org/4MAssociation

