# EUROMECH
## EUROPEAN MECHANICS SOCIETY

# Final Report

EUROMECH Colloquium No: 350

Title: Image Analysis, Porous Materials and Physical Properties

Dates and location: 3-7 June 1996 , CARCANS (BORDEAUX) FRANCE

Chairman: D. BERNARD

Co-Chairman: R. EHRLICH

Is there need of another Colloquium on the same or a related subject? Which year? Yes , 1998

Full registration fee: 4250 FF All taxes included (3524 FF for EEC Public institutions. No VAT required)

What other funding was obtained? IFP 3000 FF , CNRS 3000 FF

What were the participants offered? All was included (transport, accomodation, dinners, ...) See document jointed.

Number of members of EUROMECH (reduced registration fee):
Important reductions (from 25% to 75%) have been proposed to a few (6) persons in order to make their participation possible.

Number of non-members of EUROMECH (full registration fee): 35

Number of participants from each country:

| Country | | Country | | Country | |
|---|---|---|---|---|---|
| Austria | | Germany | 1 | Romania | |
| Belgium | 1 | Great Britain | 3 | Russia | 1 |
| Byelorussia | | Greece | 2 | Slovakia | |
| Bosnia | | Hungary | | Slovenia | |
| Bulgaria | | Ireland | | Spain | |
| Croatia | | Italy | | Sweden | |
| Czech Republic | | Latvia | | Switzerland | |
| Denmark | | Lithuania | | Ukraine | |
| Estonia | | Netherlands | 2 | Yugoslavia | |
| Finland | | Norway | 1 | Others | 5 |
| France | 10 | Poland | | | |
| Georgia | | Portugal | | Total | 35 |

**Please turn**

Please use additional pages if needed. Put date and signature at the end.

19.12.96

D.BERNARD

# EUROMECH 350
## Image Analysis, Porous Materials and Physical Properties

## FINAL REPORT

The colloquium focused on the use of image analysis as a preferential tool towards understanding, modelling and prediction of physical properties of **real** porous media.

All physical properties were concerned: mechanical, electrical, acoustical, hydraulical, chemical, ..., and for all type of real porous media, natural : rock, snow, ice, wood, or artificial : concrete, ceramics, composite materials, ....

The 22 oral presentations and the 5 posters covered a large part of the very extended proposed domain:

- Treated physical properties have been : porosity, permeability, capillary pressure, diffusion coefficient, dispersion coefficient, thermal conductivity, mechanical properties, electrical and magnetic properties and electroosmotic properties.
- Porous material considered were : sedimentary rocks, snow, wood, bones, cementious materials, composite materials, artificial 2D materials, porous titanium, vycor glass, ceramics.
- Fields of application concerned have been : hydrogeology, oil exploration and production, medicine, global change (snow compaction), forestry, aeronautics (composite materials), building, environment, mathematical and physical theories.

This variety of subjects combined with the informal character of the colloquium (and the very nice weather) permitted long and fruitful exchanges between participants.

It is difficult, if not impossible, to define and to classify all the interactions between the different topics discussed during the week. Nevertheless, it is possible to draw a first general scheme:
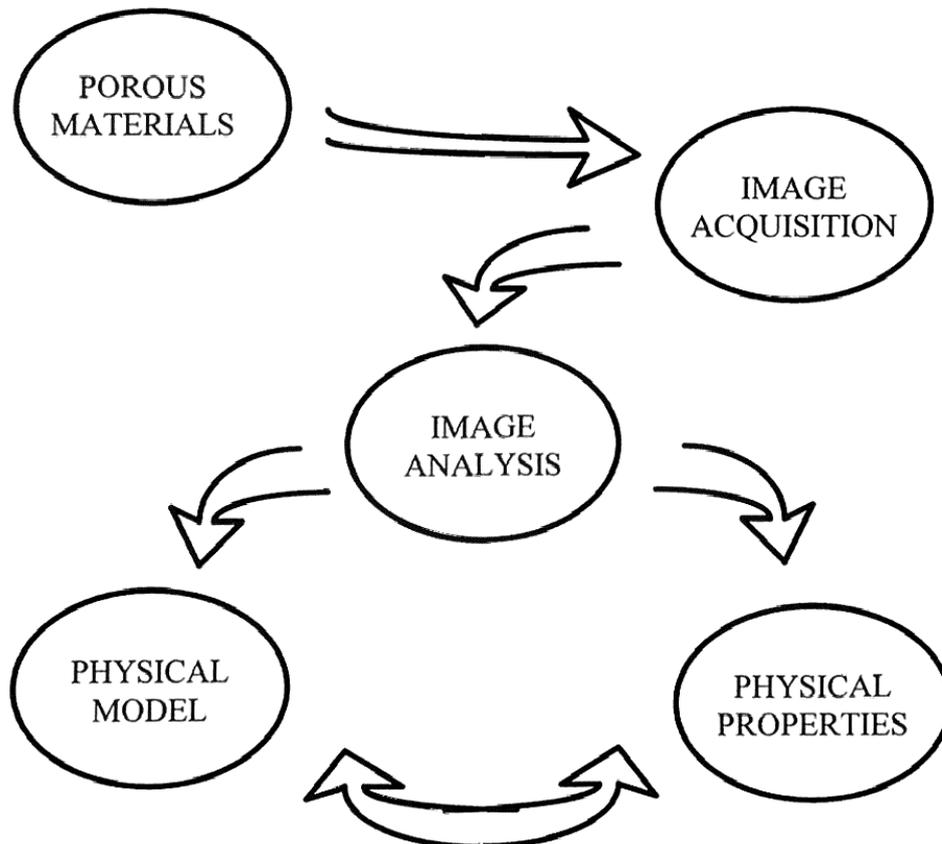
The announcements were enough precise in the definition of the aims of the colloquium. Consequently, all presentations were concerned by several modules (themes) of this scheme. Nevertheless, a lot of presentations (too much ?) were devoted to physical models *potentially* using IA as a source of information to calculate physical properties. All participants agreed on the importance of those models (volume averaging, homogenisation, ...) but also on:

- the necessity to have good images (image acquisition was precisely presented in only one presentation and one poster),

- the problem of characterising 3D media using 2D data.

This scheme is too simplified to incorporate all the works presented during the week. Some were mainly devoted to the definition of precise and rapid method of classification and some other used IA in the process of physical properties measurement (dispersion in 2D artificial media). This is a demonstration of the wealth of the topic more than a sign of imprecision in its definition.

A few remarks to close this report:

- there is no other meeting covering the same topics,
- a lot of related domains of research were not presented this year,
- the participants of this year constitute a good starting point to diffuse information about a possible new colloquium,
- examining the way information circulated before the EUROMECH 350 colloquium I propose the following classification by decreasing efficiency:
     * direct contact of authors of publication in the field (after a thematic research in the Current Contents issues of the last two years),
     * diffusion of the title of the colloquium and of my email address by the EEC Web server,
     * Euromech program diffusion,
     * colleagues of French colleagues,
     * Euromech correspondents network.
- economical problems are so important now (especially in east Europe) that a lot of potential participant asked for financial support. Diffusion of information for those colleagues in not any more sufficient.


TALENCE, Monday 18 November 1996


Dominique BERNARD