

# Networking in Micro/Nano Reliability Research Encouraged by EUCEMAN, the European Center for Micro- and Nanoreliability

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## ABSTRACT

Mastering the ever growing challenges in component and systems reliability have become important criteria for the comprehensive use of advanced micro- and nanotechnologies. Advanced reliability research in the micro-nano transition region, in short micronanoreliability, is characterized by a “multi” in various sense, -materials, -functionality, -dimension, etc., and therefore increasingly requires the joint efforts of specialists from different fields. In bringing together scientists, engineers and other experts and institutions (legal entities) to collaborate on a voluntary, independent and non-profit basis, an association has been constituted which carries the name **European Center for Micro- and Nanoreliability e.V.**

**Keywords:** microreliability, nanoreliability, micromaterials, microsecurity, smart systems reliability tools

## 1 AIMS

Based on the conviction that advanced micro and nanotechnologies are continuing to have an ever stronger influence in all spheres of human life and will permeate them even more fully in the future, without, conversely, being accompanied by a strong increase in knowledge of issues concerning their reliability, an association has been constituted in Berlin, capital of Germany, which carries the name “EUCEMAN – The European Center for Micro- and Nanoreliability”. The main office of the association has been established in Berlin. The association carries the acronym EUCEMAN.

EUCEMAN pursues these aims:

- EUCEMAN promotes interdisciplinary research and development as well as co-operation in designated areas of reliability of materials,

- Components, systems, tools and techniques with a particular focus on micro and nanotechnologies, including their applications for business, science and technology, as well as everyday-life concerns (household, leisure, sports, health, security, etc.).
- The main objective is the promotion and support of co-operation between scientists, the industry and society at large and in particular between research institutions and industry.
- EUCEMAN pays particular attention to the induction of synergies in the above-stated fields, extending to the initiation, organisation and leadership of activities, project proposals and joint projects.

In bringing together scientists, engineers and other experts and institutions, to collaborate on a voluntary, independent and non-profit basis, EUCEMAN endeavours to fill the following needs:

- raise awareness about reliability issues on the micro-nano scale,
- strengthen research and application of the addressed topic by integrating at international level the mass of issues, resources, and expertise
- overcome fragmentation of research and enable synergism resulting from different but jointly applied approaches and tools
- contribute to the organisation and realisation of the development of research strategies, especially the member states of the EU,
- launch, promote and co-ordinate initiatives, proposals and important projects,
- foster the dissemination and focused application of the latest research results and scientific findings concerning the high-technologies in the field.

EUCEMAN makes it their aim to represent the leading edge in science and technology in the reliability field for the European region, empowered by the association’s members and their councils.

Further, EUCEMAN acts as provider of reviews, evaluations, trend analyses, forecasts, recommendations and support, including funding [1].

## 2 ORGANIZATION

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Executive bodies of EUCEMAN are (Fig.1)

- the General Meeting of Members and
- the Presidium of the Association.

To gain its aims EUCEMAN is entitled to form additional committees and councils as and when they consider it necessary.

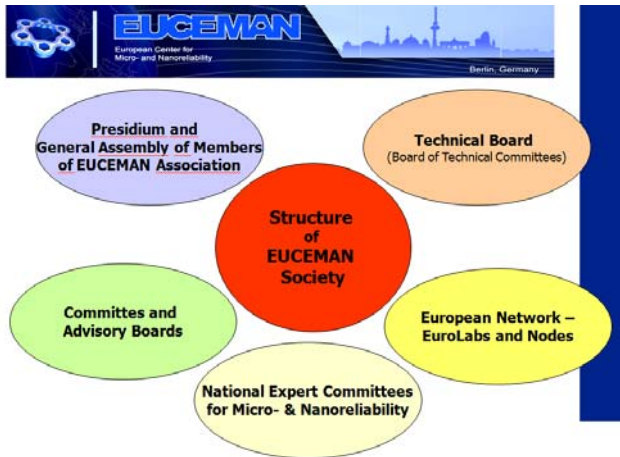


Figure 1: Structure of EUCEMAN

Together with the founding of EUCEMAN, the following boards and committees, which all report to the Committee of the Association, are formed (Fig.2):

1. *Industrial Advisory Board*
2. *EUCEMAN Reliability Expert Committee*
3. *Internat. Scientific Advisory Board*
4. *EUCEMAN Strategy Council*
5. *SME Committee*
6. *International Liaison Committee*
7. *EuroLab Council*
8. *EUCEMAN Award Committee*
9. *Membership Committee*

Later on, *Technical Committees* facing specific technical areas will be formed.



Figure 2: EUCEMAN boards and committees

Moreover, *EUCEMAN Nodes* will be established acting on different regions of Europe and promoting co-operation and bordercrossing activities of specialists from neighboured countries.

Furthermore, the EUCEMAN members form some *EUCEMAN National Centers* within their countries, for example in large cities or huge industrial centers (Fig.3).

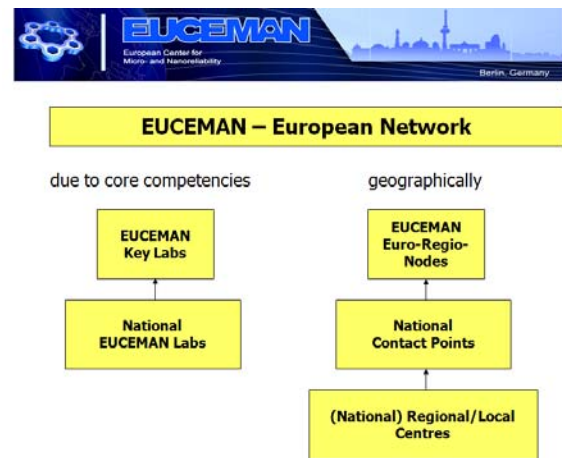


Figure 3: EUCEMAN network nodes

For more information, see also: [www.euceman.org](http://www.euceman.org).

## 3 ACTIVITIES

### 3.1 Reliability Key Labs

Reliability key labs are being established within the framework of EUCEMAN research activities to strengthen groups and labs in different European countries which have become the stakeholders of reliability research and exert a major input connected with important reliability projects on the European and national or local level as well. EUCEMAN reliability key labs have already been formed in Germany, Austria, The Netherlands, Switzerland, Poland, Sweden and the United Kingdom.

### 3.2 Partners

EUCEMAN has been collaborating with specialists from university institutes and labs, research institutes and companies from many European countries. Very active are groups from Austria, France, United Kingdom, The Netherlands, Switzerland, Germany, Poland, Romania and Sweden. There are many activities of EUCEMAN to establish further EUCEMAN reliability key labs in the other European countries (see e.g. chapter 3.1.) as well. Implementation of joint research projects (IPs, STREPs or JTIs) is a major task of collaborating labs and individual members.

### 3.3 Large-scale Research Projects

Selected projects:

- European Integrated Project *NanoPack* (participants: IBM, Fraunhofer, Bosch et al.)
- European projects within the *Clean Sky JTI* (European Joint Technology Initiative, reliability projects for green avionics)
- European Project *NanoInterface*
- *TeSiMat* - Test System for Reliability of Materials Interconnects in Micro- and Nanoelectronics

### 3.4 Conferences organised or supported by EUCEMAN

Recent activities by EUCEMAN are the organisation of

- First World Conference in the field of reliability of high tech applications *MicroNanoReliability 2007* held in Berlin on Sept. 2-5, 2007, see [2], the succeeding one is planned for 2012
- *MicroCar* bi-annual conference series on micro materials, nano materials for automotive applications, see [4]
- *NanoScience* Leibniz Conference on Advanced Science, see [5]
- Co-editorship of the international publication series “*Micromaterials and Nanomaterials*”,

During the MicroNanoReliability congress, the **EUCEMAN Award** was given to Kouchi Zhang (NXP Eindhoven, The Netherlands), Herbert Reichl (Fraunhofer IZM, Berlin, Germany) and Michael Pecht (University of Maryland, USA) for their merits on research in micro- and nanoreliability.

In 2009, the award was presented to Bernd Michel on the occasion of his 60<sup>th</sup> birthday [6].

### 3.5 Conferences

Further reliability-centered conferences or conference series, co-organized or sponsored by EUCEMAN are (selection):

- *EuroSimeE* – Paris/France, Delft/The Netherlands, Bordeaux/France, Berlin/Germany
- *Smart System Integration*, Barcelona/Spain, Brussels/Belgium, Como/Italy
- *Safety and Security Systems*, Potsdam/Germany
- *Polytronics*, Garmisch-Partenkirchen/Germany

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