

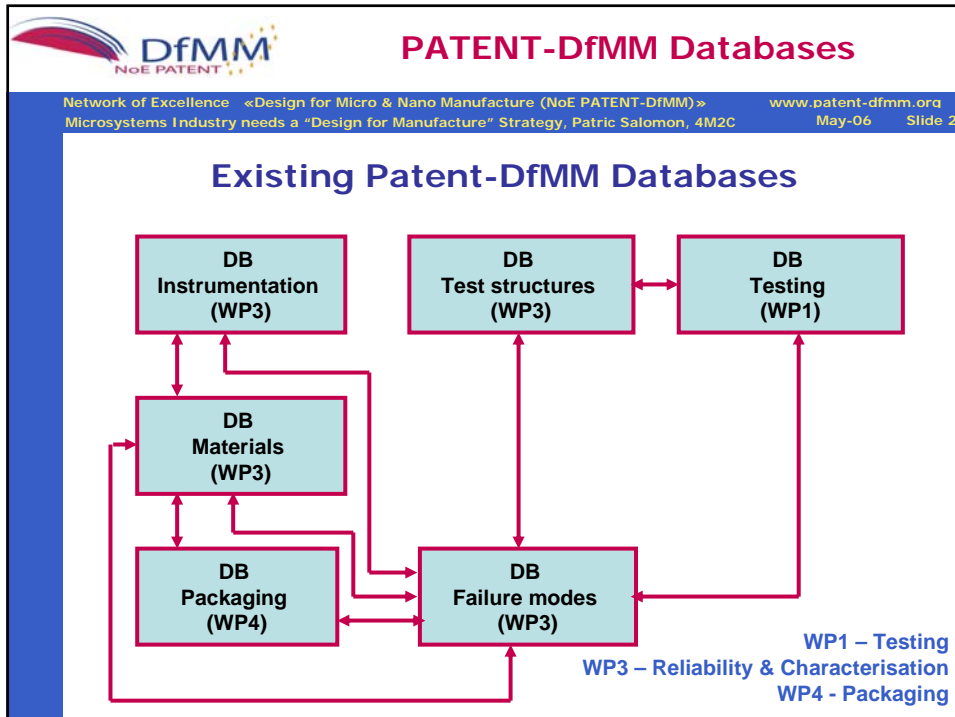



PATENT-DfMM Databases

Dr.Marius Bazu, IMT-Bucharest

*Workshop on Design for Reliability and Manufacturability in MNT
25 April 2006, Stresa, Lago Maggiore, Italy*

«Design for Micro & Nano Manufacture (NoE PATENT-DfMM)»
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Database on properties of materials used in MEMS:

- Activity led by Institute d'Electronique Fondamentale - IEF-UPS (Paris, France)
- Materials: c-Si (bulk), Polysilicon (LPCVD), SiO₂ (bulk, thermal, LPCVD, PECVD), SiN_x (bulk, LPCVD, PECVD, APCVD), Au (bulk, sputtered, evaporated), Al (bulk, evaporated, sputtered), Al(Cu) & Al(Si) sputtered, Cu (bulk, evaporated, electroplated, sputtered), W (bulk) & W sputtered Pt (bulk), Ti (bulk, evaporated, sputtered), etc.
- Collation of data from external sources, identification of missing data, round robin test (on samples fabricated by Patent-DfMM partners)
- More than 500 references
- Database – under construction (IMT-Bucharest, Romania)




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Database on instrumentation for characterisation and reliability testing in MEMS:

- Activity led by IMT-Bucharest (Romania)
- More than 90 references (instruments existing at Patent-DfMM partners)
- Database on instrumentation is connected with the database for materials, by the techniques used for characterising material properties
- The running database is hosted at IMT-Bucharest (www.imt.ro/patent)



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Database on MEMS failure modes for microsystems devices and packaging:

- Activity led by Heriot-Watt University - HWU (Edinburgh, Scotland).
- The database format is Wikki (based on php).
- An alpha version of the database has been online since March 2005 within the PATENT network for comments and entering of new data.
- The working groups on Packaging solutions should also add data.

Database on MEMS packaging solutions:

- Activity led by QinetiQ (Malvern, UK).
- QinetiQ works with HWU to realise this initial WIKI database
- The WIKI database is hosted at HWU.



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Database for practical Design for Test (DfT) solutions :

- Activity led by Laboratoire d'Informatique, de Robotique et de Microelectronique LIRMM (Montpellier, France).
- Collation and collection of solutions achieved through review of over 100 publications.
- Database is online for the public. The format of the database is Web-based along similar lines as the PATENT Website itself.

Database on test structures for Microsystems devices and packaging :

- Activity led originally by InterUniversity MicroElectronic Center - IMEC (Leuven, Belgium).
- Now IEF-UPS (Paris, France) is doing the coding.

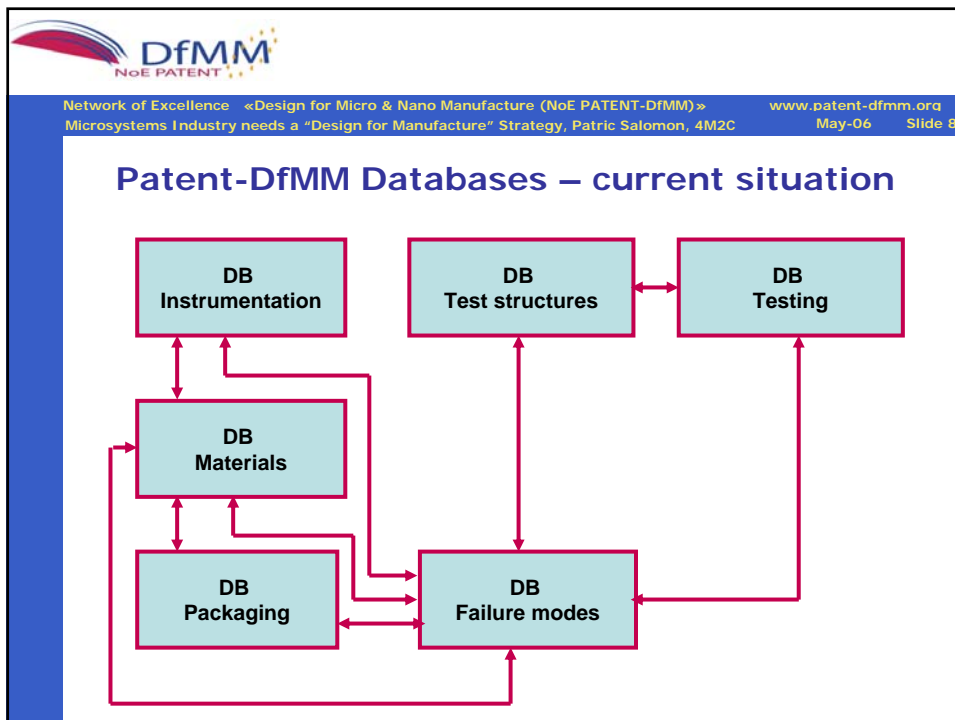
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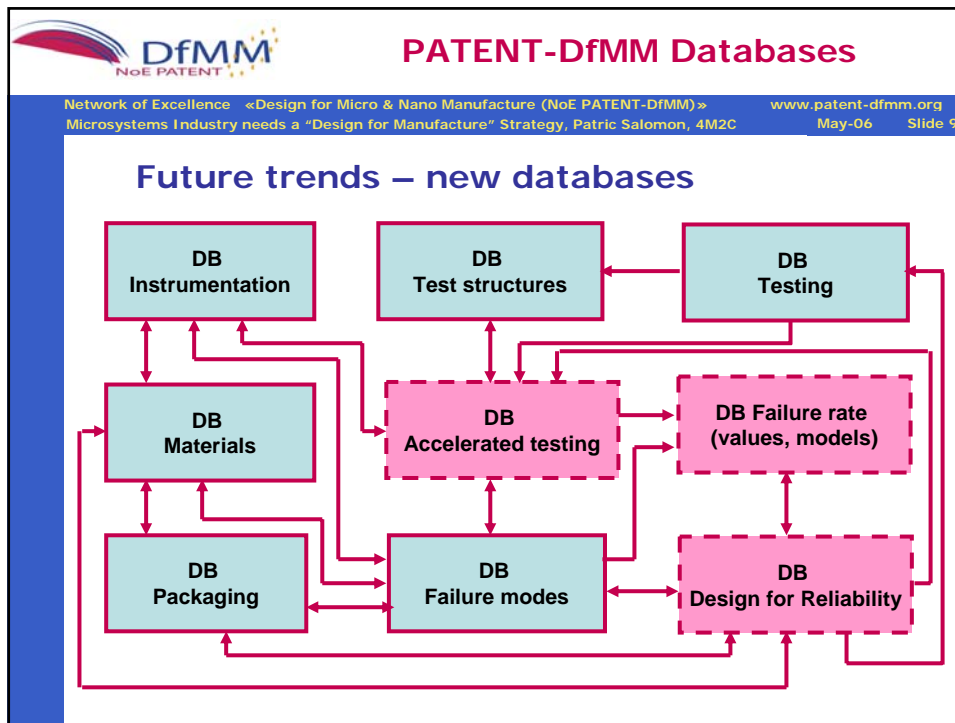
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Why Databases?

- Internal tool of the network Patent-DfMM for working as a virtual laboratory (e.g. database for instruments allows, at customer demand, to find the most appropriate equipment of the network for characterisation and testing).
- Part of the network offer for: academic media (training, etc.) and SMEs (databases for materials, test structures, etc.).
- The database for instruments could be used in connection with SOLAR (another project of Patent-DfMM, allowing a remote access to instruments for characterisation: specialists working in different locations may intervene, influencing the way the investigation is conducted).
- All databases will be interconnected till December 2006.





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Conclusions

- Patent-DfMM already created **6 databases**, covering: instrumentation, materials, test structures, failure modes, packaging and testing solutions for MEMS.
- All databases will be **interconnected** till December 2006.
- These databases are used as:
 - **internal tools** of the network, useful for working as a virtual laboratory,
 - **part of the network offer** for academic media and SMEs.
- Three other databases for MEMS will be developed in the near future, for: **accelerated testing**, **design for reliability** and **failure rate values**.