

Welcome

Welcome to the 5th newsletter from the PETMEM Consortium – keeping you up to date with our activities and general topics of interest. We are on twitter, follow us @petmem2020 to receive all the latest updates.

The PETMEM Project

We are developing several PiezoElectronic Transduction technologies where voltage is transduced to stress for the activation of a facile insulator–metal transition, thereby achieving multi-GHz switching speeds, as predicted by modelling, at lower power than the comparable generation field effect transistor (FET). The PETMEM project is tackling the most important barrier currently slowing down the expected evolution of CMOS where power, proportional to voltage squared, is not lowered and hence speeding up chip operation would exceed acceptable power consumption, leading to the stasis in speed. We are working on the development and characterization of new materials as well as the tools required to enable the fabrication of an entirely new low-voltage, memory element and high-speed RF switching chip.

Highlights to date

At the PETMEM consortium was at the University of Gent, Belgium on the 10th and 11th of January 2018 for our Month-24 consortium meeting. The partners discussed the progress made in the last 6 months with emphasis on resolving some critical research challenges. We have developed a structured plan to mitigate the risk presented by the identified challenges and to focus our efforts towards the development of the integrated device demonstrators. On the 12th of January 2018, the PETMEM consortium partnered with Poet in the City and Aurora Orchestra (both in London) to engage the public about the possibilities of the PETMEM technology. Through a collaboration between poet Frances Leviston, composer Martin Suckling and the scientists (particularly at NPL and Electrosiences) working on the PETMEM technology, new works (music & poetry) have been created and presented to construct new pathways for the wider public to explore and understand this new technology.



The artists looked at their personal relationships with memory, and paid homage to the artists whose legacy inspired their own work- Emily Dickinson

PETMEM was at:

Our partners attended the following events in the last 6 months:

January 10-11, 2018:
PETMEM Month-24 Consortium meeting at University of Gent, Belgium.

January 12, 2018: PETMEM Public Engagement: Time Unwrapped season at the Kings place, London.

January 15-16, 2018:
PiezoMEMS 2018 Workshop, Orlando Florida, USA.

January 21, 2018: MEMS 2018 Conference, Belfast Ireland.

May 27, 2018: ISAF 2018 Conference, Hiroshima, Japan.

Meet the PETMEM Team

Our partners will be at the following events in the next 6 months:

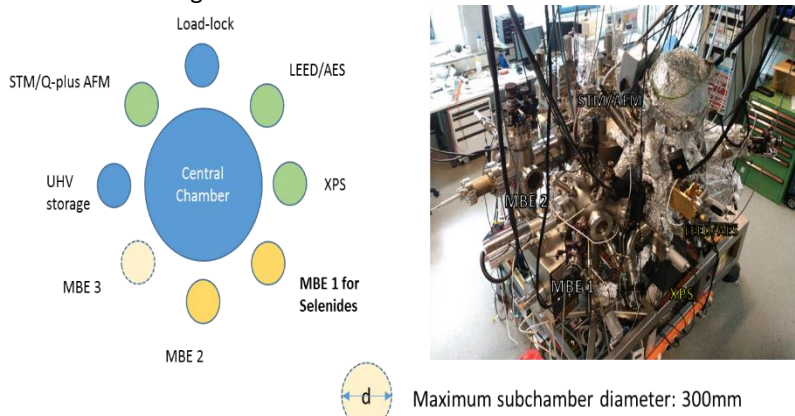
July 2 - 3, 2018: 7th International conference on Smart Materials and Structures, Vienna, Austria.

July 9 - 12, 2018:
Electroceramics XVI conference, Hasselt, Belgium

August 20-21, 2018: 20th International Conference on Electroceramics , London, UK.

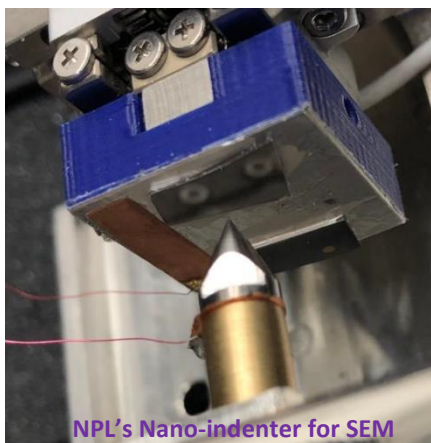
and Franz Schubert. The public recital was presented live at Kings Place, London with additional speakers including experimental physicist Prof. Markys Cain and author and editor Simon Barraclough. We are delighted that parts of the works created has gone on to be included in such publications as the London Review of Books.

As of Month 30, the consortium has made a lot of progress which includes the deposition of epitaxial PMN-PT on STO and epitaxial TiN (by Sintef and Solmates) as well as the deposition of optimized Heusler compound and SmS with RE (by Max Planck Institute and University of Gent) all on 150 mm silicon wafers for generation 3 devices.



The MBE cluster (PAPAYA) at Max-Planck-Institute in Halle, Germany.

The capability to scale-up the material deposition on 200 mm silicon wafers have been demonstrated by Solmates with confirmation from other partners that their current tools can be upgraded to handle larger wafer sizes. NPL conducted a feasibility study to assess the effectiveness of the SAW technique for the elastic property measurement of thin films. They also used the Instrumented Indentation Testing (IIT) technique to characterise the mechanical and electrical properties of functional thin films used in the PETMEM project. aixACCT led the efforts on the characterisation of the



NPL's Nano-indenter for SEM

piezoresistive material and stress induced resistivity changes in piezoresistive thin films. The commercial aixACCT system offers blocking force measurement capability for piezoMEMS and can determine the performance of processed thin films. The device integration work at IBM and EMPA is progressing well with the first device demonstration due in third quarter of 2018. BNC and Electrosciences is leading the

dissemination efforts and the incorporation of physical properties of material (PE & PR) into the PETMEM interactive software. We will continue to work to meet our research targets and further deepen our public outreach programme.

October 14 - 18, 2018:
American Ceramic Society,
Columbus, Ohio, USA.

October 22 – 25: 2018 IEEE
International Ultrasonics
Symposium, Kobe, Japan.

November 25-30: 2018 MRS
Fall Meeting, Boston,
Massachusetts, USA.

Learn more:

Please visit our website (www.petmem.eu) for more information. Please follow us on twitter (@petmem2020).

The full video of the PETMEM public outreach event is available on the news page of the project website.