

## 11<sup>th</sup> ASCENT Newsletter – October 2018

### #1

### ASCENT access limited!

The take-up of this fully funded access programme has been wide-reaching across the globe. Researchers from India, Korea, America as well as the majority from Europe have engaged and accessed nanoelectronics infrastructure at partner sites in Belgium, France & Ireland.



The network membership has grown every year, as has the number of applicants. A page on the website entitled Success Stories is now expanding from the research carried out – see: <http://www.ascnt.network/community/success-stories/>

Now, we are reminding all researchers who wish to access any of these three research infrastructures to act immediately to avoid disappointment.

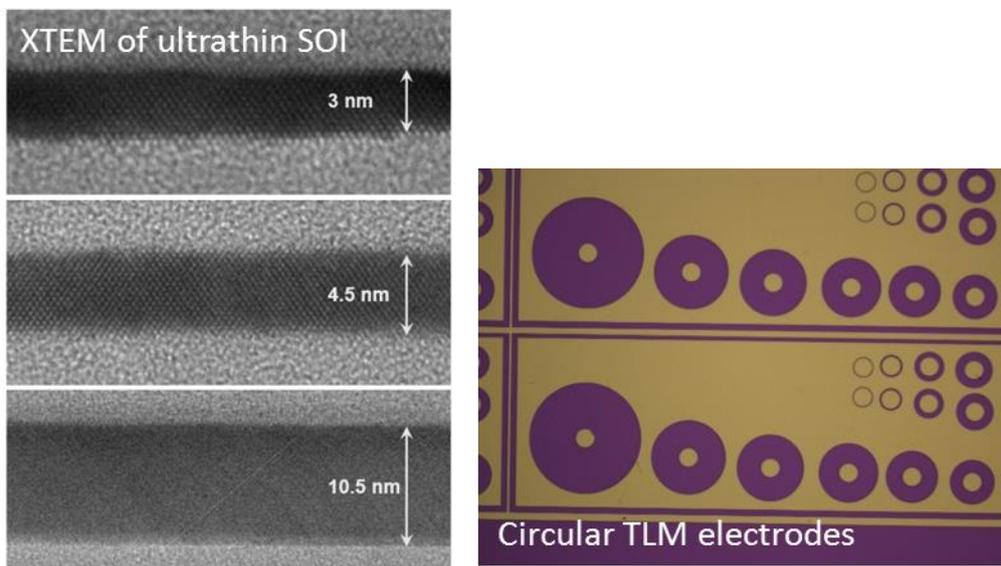
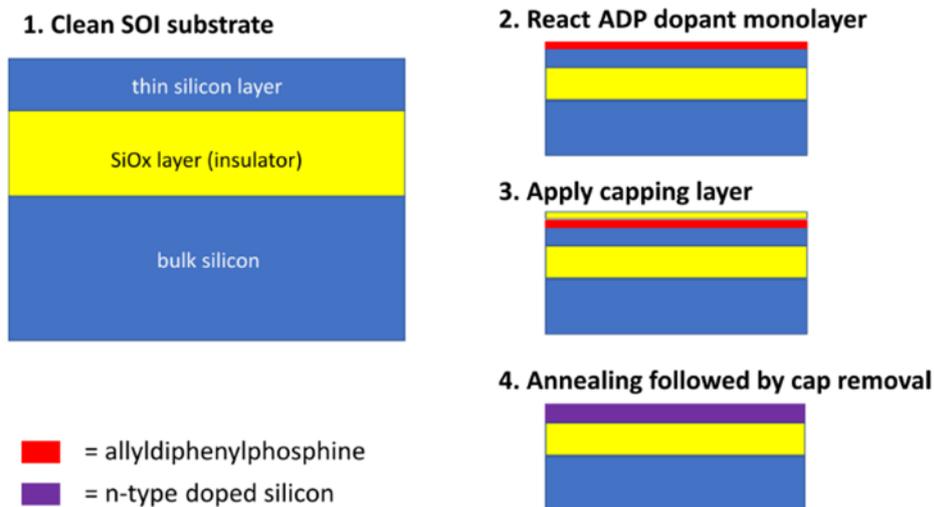
Contact: [paul.roseingrave@tyndall.ie](mailto:paul.roseingrave@tyndall.ie) for an overview of ASCENT.



This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 654384.

## #2 Joint Research Activity

### Mono-layer doping process



This research investigates doping in the nanoscale, measuring electrical resistivity of ultrathin silicon-on-insulator (SOI) as the Si film thickness enters the sub-10 nm regime. The work aims to highlight the difficulties of conventional methods for doping ultrathin Si films, as well as the inherent complications that arise from increased surface contributions, quantum effects, and reduced carrier mobility.

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SOI samples were doped using a molecular mono-layer doping (MLD) process, where dopant-containing molecules are deposited on the surface and the dopants subsequently diffused into the Si film by annealing. MLD is a gentler and more conformal doping process which makes it attractive for applications such as ultra-fine 3D nanowires, and gate-all-around FETs.

Electrical characterisation is achieved by means of resistivity analysis obtained using the circular transmission line method (CTLM). CTLM measurements use geometrically defined electrodes on the surface of the doped Si films to measure the resistance of different lengths of a material. SOI samples with Si thicknesses between 66 nm and 3 nm have so far been measured. A paper is in preparation to publish the initial findings from this work.

SOI samples of varying thicknesses and CTLM electrodes were produced by the Central Fabrication Facility at Tyndall. Cross-sectional TEM were obtained at the Electron Microscopy Analysis Facility (EMAF) at Tyndall. Mono-Layer doping of SOI was carried out in collaboration with The Materials Chemistry and Analysis Group (MCAG) of University College Cork.

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## #3

### Upcoming EF ECS Conference

ASCENT will have a stand at this conference (20th-22nd November) in Lisbon, Portugal.



The European Forum for Electronic Components and Systems (EF ECS) is the international gathering with a focus on 'Our Digital Future' along the Electronic Components and Systems value chain in Europe. The organisers of this event: AENEAS, ARTEMIS-IA, EPoSS, ECSEL Joint Undertaking and the European Commission, in association with EUREKA, have joined forces to bring all stakeholders together on 20-22 November 2018.

EF ECS provides numerous opportunities to learn more about the latest developments, cooperation and funding possibilities in the ECS Community.

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## #4 Infrastructure Conference - Report

The 4<sup>th</sup> International Conference on Research Infrastructures (ICRI 2018) was held in Vienna between 12<sup>th</sup> and 14<sup>th</sup> September 2018. The conference looked at the long-term strategy for research Infrastructures for the next 30 years. ASCENT was represented alongside many other large research infrastructures (RIs) from across the world.



It was very interesting to see that, as well as major scientific impact of large scale infrastructures such as CERN (particle physics) and ALMA (world largest telescope), there is also a significant societal impact if we collaborate as ‘one world’ and address global challenges together. Commissioner Carlos Moedas also emphasised how science is a tool for diplomacy and contributes significantly to maintaining peace and collaboration between countries.

While the plenary sessions tackled the broad issues of policy and future directions, the parallel sessions looked at international aspects of RI: human resources, fostering diversity, enhancing societal value and managing data. Attendees from over 50 countries participated in the conference and there were many high quality presentations and good interactions and debates. <https://www.icri2018.at/>

The main lesson learnt from the conference was that RI's contribute significantly to solving global societal problems. However to achieve that we must ensure that they are open and accessible to all and that the impacts of our research are clear to everyone, not just the research community itself. Large infrastructure needs large funding over long timescales so unless their impact is clear to all then the funding to build, maintain and grow will be increasingly difficult to justify.

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## #5 MOS-AK Workshop - Report

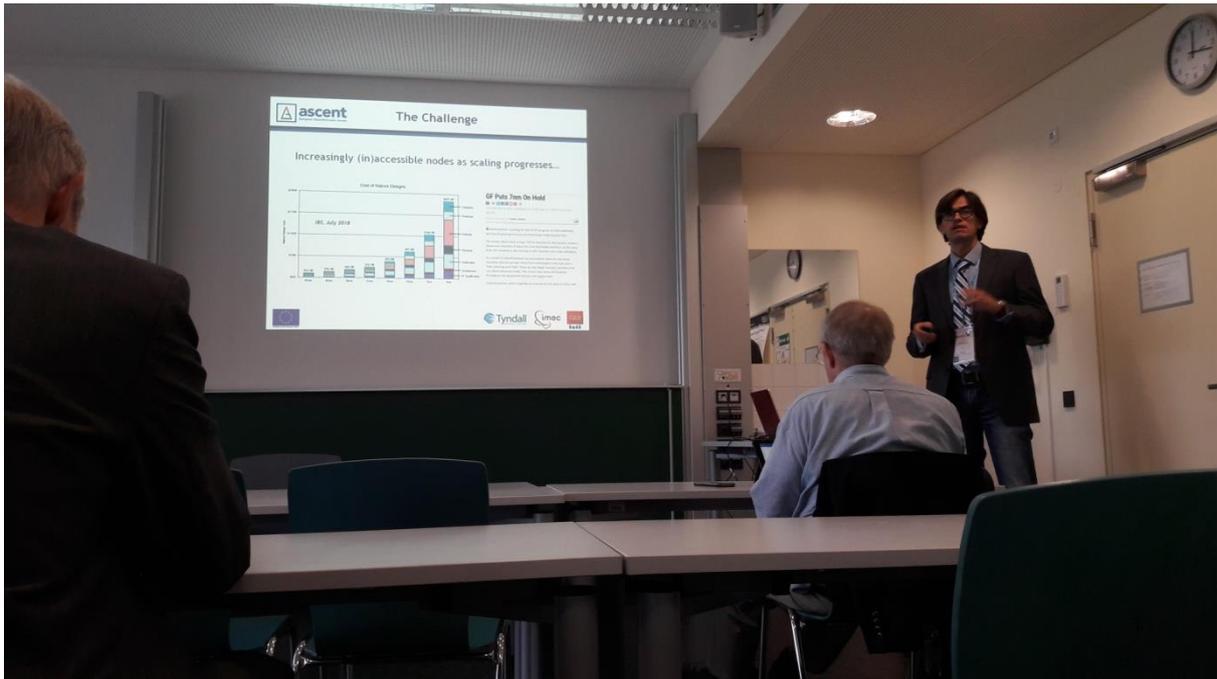
ASCENT have partnered with MOS-AK over the past few years to help spread the word about this unique opportunity for researchers across Europe and beyond.



The MOS-AK Compact Modeling Association, a global compact/SPICE modeling and Verilog-A standardization forum, held its 16th MOS-AK Workshop in the timeframe of ESSDERC/ESSCIRC.

The event was hosted on 3<sup>rd</sup> September, 2018, by the TU Dresden in Dresden, Germany. The workshop has received technical program promotion provided by ASCENT Network, Europractice, EPFL EDIlab, IJHSES as well as NEEDS of nanoHUB.org

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Dr. Luca Perniola from CEA Leti presented on behalf of ASCENT. Luca's presentation entitled "Advanced PDK and Technologies accessible through ASCENT" explained what was on offer to researchers and also presented information about an advanced SPICE model for 3D mosfets: The Nanowire Surface Potential Model.

#### **About MOS-AK Association**

MOS-AK, an international compact modeling association primarily focused in Europe, to enable international compact modeling R&D exchange in the North/Latin Americas, EMEA and Asia/Pacific Regions. The MOS-AK Modeling Working Group plays a central role in developing a common information exchange system among foundries, CAD vendors, IC designers and model developers by contributing and promoting different elements of compact/SPICE modeling and its Verilog-A standardization and related CAD/EDA tools including FOSS for the compact/SPICE models development, validation/implementation and distribution. For more information please visit: [mos-ak.org](http://mos-ak.org)

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