



# PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 40th cycle

Research Area n. 2 - Electronics

**THEMATIC Research Field: CHARACTERIZATION AND MODELING OF VRT ISSUES IN  
DRAMs**

**Monthly net income of PhDscholarship (max 36 months)**

**€ 1400.0**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

## Context of the research activity

<p><b>Motivation and objectives of the research in this field</b></p>	<p>Variable retention time (VRT) phenomena are impacting more and more the DRAM scaling. Recently, JEDEC standards for DDR5 and LPDDR6 brought in embedded ECC for dealing with VRT in DRAM Quality and Reliability requirements. However, even with ECC the VRT phenomena are still challenging for the scaling roadmaps and a better knowledge of VRT should help in the mitigation of impact on Q&amp;R and performances, including power saving for mobile applications. Aim of the research is the experimental characterization and modeling of VRT in advanced DRAM nodes.</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>Experimental characterization of VRT at different temperatures will be conducted, mainly at the Micron site in Vimercate, for packaged and die samples. Modeling activity will take place at Politecnico.</p>
<p><b>Educational objectives</b></p>	<p>The candidate will be required to manage interdisciplinary issues, perform and interpret complex experiments and benchmark new tools in an international context. This will build a strong education in the field of semiconductor memories and DRAMs, together with a solid background and know-how in physics, technology and materials engineering. Experts in new devices and process development for their fabrication will be more and more</p>



	crucial to grant competitiveness and innovation content in the semiconductor world.
<b>Job opportunities</b>	Highly qualified positions in private and public R.&D. in a wide range of industries related with production, development and application of semiconductor devices. Previous PhD owners work in Micron, STMicroelectronics, Intel and other companies.
<b>Composition of the research group</b>	2 Full Professors 0 Associated Professors 1 Assistant Professors 6 PhD Students
<b>Name of the research directors</b>	Alessandro S. Spinelli, Christian Compagnoni

<b>Contacts</b>	
Prof. Alessandro S. Spinelli alessandro.spinelli@polimi.it	
Prof. Christian Monzio Compagnoni christian.monzio@polimi.it	

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p><u>EDUCATIONAL ACTIVITIES</u> (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student. 5.707,20 Euro</p> <p><u>TEACHING ASSISTANTSHIP</u>: availability of funding in recognition of supporting teaching activities by the PhD student. There are various forms of financial aid for activities of support to the teaching practice.</p>



The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

COMPUTER AVAILABILITY:

1st year: Yes

2nd year: Yes

3rd year: Yes

DESK AVAILABILITY:

1st year: Yes

2nd year: Yes

3rd year: Yes

Premiality

Premialities will be recognized to the PhD candidate.

Up to 2400 euro (gross amount) after the completion of the 1st year;

Up to 2400 euro (gross amount) after the completion of the 2nd year;

Up to 2400 euro (gross amount) after the completion of the 3rd year.

Premialities will be assigned provided that she/he demonstrates a significant contribution to the growth of scientific excellence and the industrial valorization of research.

Shared workstations and desks will also be available at the lab premises.