



## Internship Position



N° :

### Required skills in:

Physics	<input checked="" type="checkbox"/>	Chemistry	<input type="checkbox"/>	Mathematics	<input type="checkbox"/>	Material sciences	<input checked="" type="checkbox"/>
Health sciences	<input type="checkbox"/>	Biology	<input type="checkbox"/>	MEMS	<input type="checkbox"/>	Metrology	<input checked="" type="checkbox"/>
Mechanics	<input type="checkbox"/>	Robotics	<input type="checkbox"/>				
Earth Sciences	<input type="checkbox"/>	Optics, Optronics	<input type="checkbox"/>	Computer sciences	<input type="checkbox"/>	Other	
Instrumentation	<input type="checkbox"/>	Microelectronics	<input checked="" type="checkbox"/>	Simulation	<input type="checkbox"/>		<input type="checkbox"/>
Electronics	<input type="checkbox"/>	Scientific computing	<input type="checkbox"/>	Statistics	<input type="checkbox"/>		<input type="checkbox"/>

Education :	Duration
Master of science or equivalent	4 to 6 months

**Title:** **Process & Integration for Sub 20nm patterning solutions**

### Scope of work:

To achieve the requirements of the next technology nodes for the semiconductor Industry (see ITRS roadmap), it is mandatory to reach critical dimensions (CD) below 20nm with aggressive pitches (~45-40nm). Several integration schemes are studied at CEA-LETI, Sidewall Image transfer is the most promising one. It is a multi step strategy including process steps like lithography, deposition & plasma etching. The main goal of this internship is to achieve such aggressive dimensions using Sidewall Image Transfer.

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### Expected Work:

The trainee will start by doing a state of the art on the sidewall image transfer strategy, focusing on materials & integration schemes. The most promising solutions will be tried on 300mm wafers with industrial tools. The main goal will be to achieve <20nm features with an excellent step by step CD control, especially during the plasma etching steps. On one hand, the trainee will interact with deposition & lithography engineers to achieve the desired integration scheme. On the other hand, he will focus his work on plasma etching applied to Sidewall Image Transfer. From an experimental point of view, the plasma etching steps will be developed & optimised on LAM reactors (Inductive Coupled Plasma reactor or Dual Frequency Capacitive coupled reactor). The features will be characterized by CD-SEM and Cross section SEM (Scanning Electron Microscopy).

Links :

<http://www.minatec.com/offres/>

[www.leti.fr/](http://www.leti.fr/)

[www.itrs.net/](http://www.itrs.net/)

[http://en.wikipedia.org/wiki/Double\\_patterning](http://en.wikipedia.org/wiki/Double_patterning)

<http://www.clarycon.com/>

### Lab Address

Laboratory name	DRT/LETI/D2NT/L2MA
Address	CEA/GRENOBLE 17 rue des Martyrs 38054 Grenoble CEDEX 9 France

### Contact :

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