

**Master Sciences – Mention SPI**  
**Spécialité "Micro- Nano-Electronique"**  
**2012/2013**

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***Proposition de stage***

**Laboratoire d'accueil : InESS – 23, Rue de Loess – 67037 Strasbourg**

<b>Exploring the detection limits of organic semiconductor-based gas sensors</b>
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**A. Sujet bibliographique :**

The detection of odors at useful concentration levels with sufficient reproducibility is important in a number of applications including adherence to safety regulations, food processing, environmental remediation and medical diagnostics. While inorganic sensors are capable of detecting various vapours by direct alternations of conductance, they demand energy consumptive operation at elevated temperatures on the other hand.

As an emerging class of materials organic semiconductors have already shown their potential application for low cost gas sensors that can be operated at room temperature. The corresponding sensing mechanisms can thereby either be tuned by chemically engineering the molecular properties of the organic semiconductor or by enhancing the electrostatic interactions between semiconductor and the designated analyte by adjusting the film properties.

**B. Description du stage :**

In this Master thesis organic semiconductors will be used in a field-effect transistor configuration to further the understanding of the underlying sensing mechanisms and to advance their usability as gas sensors. The candidate will determine the detection limits and investigate the influence of geometrical factors like transistor channel length and width and film thickness on the performance of the devices. Further approaches will exploit the photoconductivity of the organic semiconductors as a mean to amplify and/or trigger the response to specific analytes.

**Responsable(s) du stage : Prof. Thomas Heiser**  
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