**Designing costumes behavior**

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Context: Designer Léa Pereyre has developed a set of costumes around the Thymio robot, which the robot animates with a few simple movements (constant wheel speed, linear back-and-forth movements, in some cases avoiding or following lines). Despite the very interesting aesthetic results obtained with this approach, some preliminary explorations have shown that better use of the Thymio's sensors and more sophisticated programming could considerably enrich the aesthetic effects.

Project overview: The project goal is to explore in a systematic way:

* All the Thymio's sensors to define which can be used to interact with existing costume types, giving a few examples of how they can interact with a few demonstrations (documented in video format)
* Which interaction possibilities could be used to interact with an external observer to make the system interactive, giving as well some examples of how they can interact with some demonstrations
* Which programming languages (VPL3, blockly, python, ...) are interesting/necessary for programming this or that interaction, and how far they allow you to go.

The approach of the project has to stay compatible with the existing goals, that are being compatible with an educational context and being focused on aesthetic results.

What the student will do. The student will take part in the cleanroom microfabrication work, by operating and analyzing the result of some of the many subsequences of steps that need to be optimized in this complex process flow, subject to the needs of the project as it advances:

* DUV stepper photo-lithography (the newest machine at the CMi): Resolution tests, Processing (BARC removal, stripping)
* Plasma etching procedures for Si etching (optical layer) and oxide patterning: Depth control, Wall smoothness.
* Oxide deposition on Si with topography and planarization: Deposition temperature, Void formation, Achieved

All these studies will rely on quantitative and qualitative metrological studies in the cleanroom (SEM, AFM, optical microscopy, profilometer, etc). The drawing of lithography layouts may be necessary to perform some of the tasks.

Student gain. Through this project, the student will gain a vast hands-on experience in microfabrication main techniques such as photolithography, thin film deposition, and etching, and apply them in the hot topic of integrated Si photonic MEMS.

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