Statement of objectives 2024

“What do you want to be when you grow up?” My answer to that question was always the same: “I want to be an inventor!”. From a young age, my fascination with invention sparked a passion for creativity and problem-solving. This childhood dream led me to explore technology, where I embraced the challenge of understanding and shaping the digital world. Today, I am applying to the Program of Media Arts and Sciences of the MIT Media Lab. I am particularly drawn to the research groups of **Tangible Media**, **City Science**, and **Fluid Interfaces**.

My background in Computer Vision applied to health, interactive design, and commercial projects, as well as my experience as an associate professor, has provided me with a unique perspective on the evolving landscape of technology and creativity. But, within this scope of technology design, there has been one which I believe is going to be crucial in the future society, **Spatial Computing**. This term, which was actually introduced in the MIT Media Lab by Simon Greenwold, may transform the way we interact with technology, and I am motivated to explore and contribute to its development.

As a matter of fact, I’ve recently been part of a project which embraced this technology to create a cutting-edge public street show. The P&B Music AR Show used Visual Positioning System to deploy virtual content overlying the buildings of Madrid, creating an impressive audiovisual experience. As a proud developer of this project, I know that this is just the tip of the iceberg of the potential of spatial applications.

Recent technological advances (both in hardware and software) such as the Apple Vision Pro or Google's Geospatial API, are proof of the importance of Spatial Computing. The convergence of digital and physical worlds is going to be more and more present in today’s society through the development of Extended Reality (XR) experiences. Moreover, the expansion of technologies based in generative AI and language models opens up the opportunity to novel and promising immersive experiences. This use of XR aligns seamlessly with the commitment of the MIT Media Lab to push the technological boundaries and put them to good use.

Not only Spatial Computing is gaining significance as an innovative technology, but its interdisciplinary use can raise interest in the research groups of different areas. In particular, each of the three groups I have listed in my application could embrace its study as part of their main research goal.

At first sight, for the **Tangible Media Group**, the use of Spatial Computing may entail a contradiction. Technologies such as AR or VR are known for bringing digital content to the physical world, which may result in replacing the tangible objects for virtual ones. But these experiences can also be used to enhance the interaction with the physical world by

providing a dynamic and context-aware layer of digital content, making the real world more informative, interactive, and engaging. Thus, transforming the way we interact with our tangible surroundings. Moreover, the XR experiences can be highly benefited by the incorporation of tangible objects on them, providing tactile engagement, spatial awareness and realism, among others. So, I do believe that Spatial Computing can have an important role in the research of the Tangible Media Group.

Spatial Computing holds significant relevance for the research group **City Science** as well, providing a valuable lens through which to understand and address urban challenges. With an ongoing inherent spatial awareness of the urban environment and its activities, XR technologies may be seamlessly integrated with them. For example, one can easily imagine an AR application which provides optimal navigation routes, but this can be complemented by real-time information on the city's services or events. Going beyond these day-to-day applications, Spatial Computing can also take an important role in visualizing and understanding city planning and designing. Last, but not least, the adaptability and minimal infrastructure requirements of these technologies make them well-suited for low-resource communities. In the context of disaster affected areas or informal communities, Spatial Computing could play a transformative role and foster connectivity, education, and resource optimization. Ultimately contributing to the overall well-being of these communities.

Finally, the use of Spatial Computing wearables can be of great use in the research of the **Fluid Interfaces** group. XR experiences provide a unique platform for creating immersive and interactive experiences that can directly impact cognitive processes. For example, VR experiences can be designed to enhance motivation through engaging simulations or to facilitate behavior change through interactive scenarios. Particularly on the theme of improving sleep, these applications can simulate calming and personalized visual environments, providing users with soothing scenes or ambient lighting to create a conducive atmosphere for relaxation before bedtime. Moreover, the integration of sensors in these wearables can monitor physiological responses, contributing valuable data to understand and regulate emotions. Overall, providing a versatile toolset for exploring various aspects of our thinking and behavior.

In conclusion, I believe that the integration of Spatial Computing in the research themes of different groups of the MIT Media Lab has great potential. While today XR experiences may be still constrained to the use of expensive (and sometimes bulky) devices, technology providers are determined to make them for everyday use. Will they be as indispensable as smartphones are today? Will they be more of an accessory asset (like smartwatches)? Time will tell, but for sure they will have a great influence. Through the Program in Media Arts and Sciences, I am eager to research them and to collaborate with the innovative and transformative work being conducted at the MIT Media Lab.