# MWP – Young Researcher Abstract 2023

**Project title: Sustainable Energy Harvesting from Wood**

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**Abstract** (approx. 200 words)**:**

Wood has been used as a source of energy for ages but often in a non-reusable manner. We explore two ways to utilize wood as a reusable and renewable energy source for green technological applications. In the first approach, we create functional materials by wood nanoengineering using mild chemical treatments to leverage the benefits of hierarchical wood structure. In the second approach, we mineralize active nanoparticles in wood to leverage their functional properties with reduced amounts compared to their bulk use. Further, we fabricate devices from these materials for 1) mechanical energy harvesting via the piezoelectric effect of wood, i.e., electricity generation from material deformation, and 2) hydrovoltaic energy harvesting, i.e., electricity generation from wood-water interaction. We demonstrate reusability and show that these devices can sense mechanical vibrations, charge capacitors, or power small electronics such as LCDs. This shows the unprecedented potential of forest-based materials in sustainable green technological applications. Sustainable creation, operation, and utilization of these materials will also positively impact societies. The lower power output of wood-based devices is a current hurdle, which could be solved by further material and device engineering. We believe this small step may lead to a leapfrog toward more advanced sustainable green technologies having minimal environmental impact.

**Key words: wood functional materials, sustainable energy, energy harvesting, green technology**