

MWP – Young Researcher Abstract 2024

Project title: Value-addition for forest products enabled by sustainable health monitoring devices	
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<p>Abstract:</p> <p>Lignocellulosic biomass is considered as one of the most promising sustainable natural resources for the future since it finds itself at the intersection of the biobased and circular economy paradigms. However, due to declining demand for conventional lignocellulosic products like pulp and paper, it has become important to convert lignocellulose into novel products. Additionally, advocacy for forest and biodiversity protection is increasing globally, thus the utilization of the harvested lignocellulose needs to be progressed towards products yielding high commercial value per ton.</p> <p>This work focuses on developing high-value applications for cellulose materials in the fields of photonics and electronics, which are further targeted towards health-tech applications. This is realized via the fabrication of films and fibers using cellulose nanomaterials and cellulose derivatives as the building blocks. Cellulose nanocomposite films are demonstrated as platforms for printed electronic health monitoring devices like electrocardiograph (ECG). Further, optical fiber fabrication from cellulose ethers and regenerated cellulose is investigated and their application in biosensing such as respiratory and heart rate is demonstrated. In conclusion, this work unveils several value-added proof-of-concept applications for cellulose materials, that could be readily upscaled and commercialized to benefit both the forest industry and the society in the near future.</p>	
Key words: cellulose, optics, electronics, sensors, bioeconomy	