

# CENIMAT

CENTRO DE INVESTIGAÇÃO DE MATERIAIS

# i3N

INSTITUTO DE  
NANOESTRUTURAS,  
NANOMODELAÇÃO E  
NANOFABRICAÇÃO

## INVITED SPEAKER

# PROFESSOR LUÍS PEREIRA

*Almascience Colab*

*Invited Associate Professor*

*Department of Materials Science - NOVA School of Science and  
Technology*

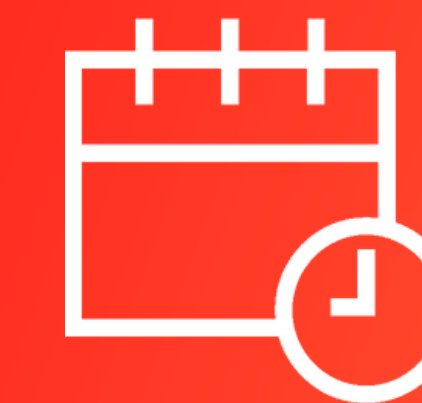
# WEBINAR

## NATURE BASED AND NATURE INSPIRED FUNCTIONAL MATERIALS FOR SUSTAINABLE TRANSIENT ELECTRONICS

The growing demand of new and sustainable consumer electronics led to the increased interest in devices integrating natural materials that can also be disposable or disintegrate in the environment. Here we present the work resulting from recent research concerning the application of cellulosic materials in flexible electronic devices.

First topic to be addressed are printable inks based on carbon fibers and zinc oxide nanoparticles mixed with cellulose derivatives that were optimized to create printed active layers at temperatures lower than 150 °C. This allowed the development of fully screen-printed sensors and electrolyte gated transistors on paper substrates.

Second topic is related to the development of cellulose based electrolytic membranes (either fiber or membrane based) to be used as dielectric in transistors exploring the high capacitance that can be obtained by the formations of electric-double layers. The optimization of the cellulose dissolution method in alkaline hydroxides allowed for self-healable ion-conducting membranes. It will be shown how cellulose nanocrystals can self-assemble in chiral nematic structures that mimic structures existing in nature. These can be then used as dielectric in field effect transistors making possible the detection of circular polarized light in such devices. Finally, it will be addressed how conductive polymers can be combined with cellulose fibers to generate energy harvesting paper based devices.



# 11<sup>TH</sup>

**JUNE, 2021**  
**01:30 P.M.**



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