

Organic electronics represents a hi-tech and rapidly expanding market – covering displays, lighting, photovoltaics, and integrated smart systems - that is forecast to grow to \$75.8 billion by 2020. Transistors are considered a fundamental “building block” of modern electronic devices, either amplifying signals or operating as on-off switches. There are many different types of transistors. Most organic transistors are organic field-effect transistors (OFETs). OFETs have several unique properties not shared by silicon transistors, most notably their flexibility. Because OFETs can be manufactured at or near room temperature, they enable the manufacture of integrated circuits on plastic or other flexible substrates that would otherwise not withstand the high-temperature conditions of silicon-based device manufacture. OFETs are also highly sensitive to specific biological and chemical agents, making them excellent candidates for biomedical sensors and other devices that interface with biological systems. Several of the leading display companies have expressed their intention to introduce flexible OLED displays in the near future, which will be lighter and more robust than glass-based displays and will allow novel display applications with new form factors. In principle, OFET technology could be an ideal backplane for this application because of the close materials compatibility between OLEDs and OFETs and their excellent mechanical properties, which might ultimately even allow foldable displays that would require tight bending on flexible substrates to the very small radius of curvature on the order of 100 μm . For this, the mechanical properties of OFETs are potentially superior to silicon or oxide based TFTs (Thin Film Transistors). The integration of OFETs with OLEDs was shown early, and several groups have realised prototype OFET-driven OLED displays. As for the project, we would like to go further and join OLED and OFET in Organic Light Emitting Transistor (OLET) approach. We want to use our experience in designing of high efficient OLED emitters and use that in formation of Organic Light Emitting Transistors. OLETs are very attractive to industry because they contribute to low-cost, large-area electronic functions and biodegradable electronics that have clear environmental benefits.