# Abstract 11: Biocompatible and Biodegradable Ionic Liquid polymer composite as Electrolyte

**Presenter: Nicole Rosselli and Leah Filardi (Undergraduate)**

**Team: Andy Kapetanakis, Ethan Ellis and Jamie Shirtz**

**School: Rowan University**

**Advisor: Vaishali Krishnadoss**

**Polymers have been previously used as insulators and other structural materials, but when combined with appropriate salts, there is an increase in ionic conductivity. This increase in conductivity can be exploited for the use of polymers as electrolytes. In this study, we present a novel biocompatible electrolyte for a battery, made of ionic liquid (IL) embedded in a biocompatible polymer such as Gelatin Methacryloyl(GelMA), Polyethylene glycol diacrylate(PEGDA). An increase of ionic liquid concentration exhibits a well-defined discharge voltage plateau of ~0.5–0.8V with a conductivity of 8.5×10-4 –3.5×10-3 S/m in both the polymers. The electrolyte, when used with a graphene electrode, also exhibits a specific capacitance of 42 – 325 F/g at a current density of 1 A/g in a three electrode system. Also, the polymer ionic liquid electrolyte has a compression modulus of 85 KPa and a tensile modulus of 115 KPa, at the highest percentage concentration of ionic liquid (20% GelMA, 20% PEGDA with 20% IL) which allows the device to be fabricated in a thin film manner with increased mechanical flexibility. Bio-implantable power sources built with biocompatible and biodegradable materials are of growing interest for future implantable medical devices and needs to be harnessed. These mechanical properties allow the electrolyte to be 3D printed. The integration of an eco-friendly, biocompatible ionic liquid electrolyte provides a new perspective on energy storage.**