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An Electronic Immersive Coater (EIC) was fabricated for Layer-by-Layer (LbL) assembly of thin films of nanostructural materials on Polylactic Acid (PLA) pellets. Inspiration for the design of this instrument originated from existing 3D printers and a 4-point probe station designed by a lab member, Mr. Yang Lu. The instrument is significantly less expensive than commercial alternatives, while still maintaining a durable structure due to its metal frame, and is powered by an open-source Arduino board. The user interface, Repetier Host, is a program commonly used for 3D printing. Given that PLA is a ubiquitous material for 3D printing, this project has the potential for facile development of advanced PLA composites for 3D printing. Here we develop LbL thin film coatings of polyaniline (PANi) nanofibers, this nanostructured conjugated polymer is an ideal candidate for energy storage applications due to its and other capacitive and pseudo capacitive properties. Conjugated semiconducting polymers can be doped and dedoped thereby inducing positive and negative charges on the molecular structure of a polymer. The flow process for engineering LbL coatings is based on alternating positive and negative electrostatic charged polyaniline layers, and results in exquisite control at the molecular scale for deposition of films with controllable thickness. Our Electronic Immersive Coater will provide homogenously coated PANi-coated PLA pellets that can be crushed and extruded as a filament for subsequent 3D printing applications. Future research will optimize these positive and negative charged electrolyte solutions for LbL coatings, thickness of films, and nanoscale morphology in order to engineer emergent properties in nanocomposites for 3D printing applications.