

**Title:** Hybrid HEFA-HDCJ Process for the Production of Jet Fuel Blendstocks

**PIs:** Manuel Garcia-Perez (WSU), Michael Wolcott (WSU), Xiao Zhang, (WSU), Mariefel Olarte (PNNL), Andrew Schmidt (PNNL), Scott Stouffer (University of Dayton Research Institute)

**Abstract:** Production of hydroprocessed esters and fatty acids (HEFA) is the best current option for jet fuel production. Hydro-deoxygenation of bio-oils derived from pyrolysis and hydrothermal liquefaction (HTL) of lignocellulosic materials produces jet fuel rich in aromatics also known as hydro-treated depolymerized cellulosic jet (HDCJ). In the short term, HDCJ (obtained from hydrothermal liquefaction and pyrolysis) is the most promising pathway for jet fuel production. In order to reduce capital and operational costs, we propose to co-process bio-crudes from fast pyrolysis and HTL with vegetable oils at conditions comparable with those used in existing commercial HEFA units. The hybridized HEFA-HDCJ process proposed will result in utilization of current infrastructure as well as reduced production costs and a product with chemical composition similar to commercial jet fuels. Bio-oils studied will be thoroughly characterized and co-hydrotreatment studies will be conducted at laboratory scale to identify desirable processing conditions. The yield of different fuel cuts (gasoline, jet, diesel, and gas oil) will be quantified and their chemical composition and fuel properties analyzed by ASTM standardized methods. 100 gallons of jet fuel will be produced in pilot plant continuous conditions and its chemical, fuel properties and combustion behavior thoroughly characterized to accelerate ASTM certification. Techno-economic analyses will be conducted to estimate minimum selling price reductions achieved with the technology proposed. A jet fuel production supply chain will be designed and evaluated for the conditions of Washington State.