

Overview

Because of the urgent need to develop sustainable technologies to minimize energy production contamination, packed bed thermal energy storage (TES) systems are being considered as a low-cost energy storage solution. Aiming to use air at roughly atmospheric pressure as the heat transfer fluid (HTF) and inexpensive geomaterials like gravel as the heat storage medium.



Cesar during a tour by the Heliostat Field at the National Solar Thermal Test Facility.

Outcomes

The National Solar Thermal Test Facility (NSTTF) counts with multiple research areas that I was able to contribute in. Regarding the Gen 3 Particle Pilot Plant (G3P3), I had the pleasure of participating in the storage sensor calibration for component build, a flux wand controller training, and readily assisted in a particle flow rate calculation for a Compact Counter Flow Fluidized Bed Heat Exchange (CCFB-HX).

In addition, I helped formulate a Complex Flux Ramp Profile Program which benefits the solar furnace process by automatically generating a set of data points guiding the ramp profile operator.

My main focus was developing a code capable of simulating and modeling a radial flow packed bed TES. These initiatives aid in enhancing the effects of the void fraction in order to choose the optimal particle size and void fraction for a given TES repository.

“This internship gave me the opportunity to gain valuable knowledge about the various components of nuclear security, as well as develop my technical skills and convincing me to pursue graduate school.”



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