

# Track Seed Classifier for ACTS

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# Track Seed Classifier

- Recently submitted a proposal to work on developing a track seed classifying plugin for ACTS
  - Will hear back ~summer
- Idea spawned from seeding implementation in sPHENIX and discussions with Andi
- Acts seeder tends to produce ~30-40% more seeds than actual tracks in occupancies expected at sPHENIX
- Idea is to develop a CNN that can classify track seeds as “good” or “bad” with some efficiency, that would then allow users to remove bad seeds (based on some ROC curve) to save computational time in track propagation/fitting

# Track Seed Classifier

- Task list for year 1
  - Generate seeding training and testing sample with Acts::Seeder on trackML detector. Can use additional ttbar events so that the testing/training sets are independent
  - Develop and train CNN with TensorFlow in python with this sample
  - Test with test data sample to validate CNN model, quantify performance, tune model as needed
  - Based on results, design API that could be interfaced with Acts
- (Assuming year 1 is successful) Task list for year 2
  - Port model to C++ for integration into Acts (python TF has many more tools/libraries/etc. available out of the box)
  - Test/develop transfer learning capabilities of model
    - Can it work on other geometries? Different events? etc. (If it will be integrated into Acts, it needs to)