# Evaluation of WireCell's workflow in uBooNE MCC10

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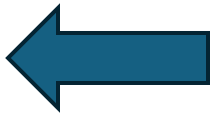
# Reports from Herb G. and Matt R.

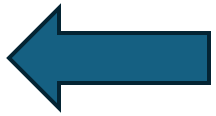
- Three issues for WireCell's (WCT/WCP) function in MCC10
- First, reco stage1: segmentation fault in uboonecode v10_00_04

```
$ lar -c reco_uboone_data_mcc9_8_driver_stage1.fcl -s
/cvmfs/uboone.osgstorage.org/stash/uboone_example_data/swizzled/PhysicsRun-2019_5_9_15_17_29-
0022417-00198_20190620T162349_bnb_2_20190620122031_merged.root --trace
...
++ constructing module: butcher
++ construction finished: butcher
++ constructing module: gaushit
++ construction finished: gaushit
++ constructing module: nfspl1
      MultiChannelNoiseDB: wclsChannelNoiseDB:wclscndbbefore using rule: runbefore
      MultiChannelNoiseDB: wclsChannelNoiseDB:wclscndbafter using rule: runstarting
Segmentation fault (core dumped)
```



Will debug this

- Second, reco stage2: unified WCP script



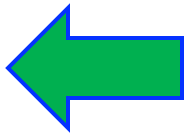
This talk

# Reco2: from MCC9 to MCC10

**Wire-Cell BNB Unified Reco2 [uboonecode release v08_00_00_53 and later]**

Data (BNB/EXTBNB)

- **Reco1 is input**
  1. <fcl>
     filter_data_beamdata_beamdataquality.fcl (**only for BNB, not EXTBNB**)
     <initsource>/pnfs/uboone/persistent/users/wgu/random_sleep.sh</initsource>
     </fcl>
  2. <fcl>
     run_celltreeub_port_prod.fcl
     <endscript>/pnfs/uboone/persistent/users/wgu/unified_reco2_wirecell.sh</endscript>
     </fcl>
  3. <fcl>
     run_slimmed_port_data.fcl
     <initsource>/pnfs/uboone/persistent/users/wgu/update_slimmed_port_data.sh</initsource>
     </fcl>
  4. <fcl>run_wcpplus_port.fcl</fcl>
  5. <fcl>
     run_wcpf_port.fcl
     <initsource>/pnfs/uboone/persistent/users/wgu/update_wcpf_port.sh</initsource>
     </fcl>



WireCell apps run in the endscript (imaging, generic nu pre-selection, pattern recog., etc.)

- Improvement required for MCC10:
  - Move endscript/initscript to uboonecode official release (done, thanks to Herb)
  - SparseConvNet loaded as a UPS in the script, but need a new version in python3
  - Segmentation fault from WC apps in the MCC10 env? Need to debug

# UPS setup in the endscript

```
setup numpy v1_14_3 -q e17:openblas:p2714b:prof
setup libtorch v1_0_1 -q e17:prof
setup SparseConvNet 8422a6f -q e17:prof
```

- The MCC9 setup in the endscript uses numpy, libtorch and SparseConvNet for python 2
- New version of numpy and libtorch are available for python 3 in the MCC10 env (uboonecode v10_00_04)
- Need to provide a new version UPS of SparseConvNet
  - Currently, we have successfully installed it in a virtual env of python 3 (thanks for Brett's instruction)

# Segmentation fault in the MCC10 env

```
terminate called after throwing an instance of 'std::out_of_range'
  what():  vector::_M_range_check: __n (which is 2) >= this->size() (which is 0)
```

- Segmentation fault from the app **wire-cell-imaging-lmem-celltree**
- Turns out to be an undefined behavior of missing return value of a function (see commit 863248a) although the returned boolean is not used in the main program

```
bool WCP2dToy::LowmemTiling::replace_wire(WCP::MergeGeomWire
*old_wire, WCP::MergeGeomWire *wire){
    ...
    delete old_wire;
+   return true;
  }
```

```
if (ordered_wire_set.size() == saved_size){
  for (auto it1 = ordered_wire_set.begin(); it1 != ordered_w
    if (wire->get_allwire().front()->index() == (*it1)->get_
        wire->get_allwire().back()->index() == (*it1)->get_a
      //std::cout << wire << " " << (*it1) << std::endl;
      replace_wire(wire,*it1);
      break;
    }
  }
}else{
```

# Todo list for MCC10

- Further debug the segmentation fault in reco stage1
- Publish a new release of WCP for UPS product
- Provide a new UPS product for SparseConvNet in python 3 env