What is LIVV?

- **Land Ice**  This one is easy.
- **Verification**  Does the code work correctly?
- **Validation**  Does the code do what we want it to?
Good Design = Good Tools

- Internal Dependency Management
- Leverage existing technologies
- Separate input, processing, and output

- Easy to set up and start using productively
- More productivity with less code
- Modular, extensible, and maintainable
Design

- Dependency Checking
- External Libraries
- Common tests
- Test modules
- Web Generation
- External Utilities

LIVV

test suite
Test Suites
Test Suites

- Validation: AbstractTest
  + run(test): result
  + generate(): void
  + bit4bit(): result
  + webSetup(): void
  + runNew(): result

- Ismip: AbstractTest
  + run(test): result
  + generate(): void
  + bit4bit(): result
  + webSetup(): void
  + runLargeA(): result
  + runSmallA(): result
  + runLargeC(): result
  + runSmallC(): result

- Dome: AbstractTest
  + run(test): result
  + generate(): void
  + bit4bit(): result
  + webSetup(): void
  + runDiagnostics(): result
  + runEvolving(): result
  + plotDiagnostics(): result
  + plotEvolving(): result

- Shelf: AbstractTest
  + run(test): result
  + generate(): void
  + bit4bit(): result
  + webSetup(): void
  + runConfined(): result
  + runCircular(): result
Good Design?

- The code worked fine before.
- Refactoring…? Boring.
- If it’s so easy to add on where’s the new stuff!? 
New Features!

- Internal Dependency Management
- User specified configurations
- Simplified IO via templating
Dependency Management

- Nobody likes figuring out how to install software
Dependency Management

- So far, limited to installing Python libraries
- Soon, installing system dependencies (NCL, NetCDF, etc.)
Configurations

user@computer :~/livv-dev/LIVV$ python livv.py -m myNewConfig -s dome all --ismip all --comment "Wow! Look at my configuration file!"

Running tests:
  dome3D/diagnostic
dome3D/evolving
  ismip-hom-a/20km
  ismip-hom-c/20km
  ismip-hom-a/80km
  ismip-hom-c/80km

Beginning test suite....
  Dome diagnostic test in progress....
    Saving plot details to /home/bzq/livv-dev/LIVV/www/imgs/dome as dome30dvel.png
Running bit by bit tests of dome3D/diagnostic....
dome.4.nc FAILURE
dome.1.gliasse.nc FAILURE
dome.1.nc FAILURE
dome.out.gliasse.nc FAILURE
Configurations

```
user@computer ~/$livv-dev/LIVV $python livv.py -m myNewConfig -s --dome all --ismip all

# Import variables for running livv on myNewConfig
#...
```
Configurations

```
user@computer ~/livv-dev/LIVV $ python livv.py -m myNewConfig

Land Ice Verification & Validation (LIVV)

Beginning Dependency Checks........ Okay!
Loading configuration file from /home/bzq/livv-dev/LIVV/configurations/myNewConfig

Current run: 01-22-2015 16:56:59
User: bzq
Config: myNewConfig
OS Type: Linux 3.13.0-24-generic
Wow! Look at my configuration file!

Running tests:
dome3D/diagnostic
dome3D/evolving
ismp.hom-a/20km
ismp.hom-c/20km
ismp.hom-a/60km
ismp.hom-c/60km

Beginning test suite....
Dome Diagnostic test in progress....
Saving plot details to /home/bzq/livv-dev/LIVV/www/ims/dome as dome3Ddiag.png
Running bit for bit tests of /dome3D/diagnostic....
dome4.nc  FAILURE
dome1.giessade.nc  FAILURE
dome1.nc  FAILURE
dome.out.giessade.nc  FAILURE
dome.out.nc  SUCCESS
```
Templating
The Future

- Support for additional dycores
- Upgrades to performance testing
- Comparison of models and observational data
- Tighter integration with CISM