Using Jupyter Dashboard and ipympl for Tropical Storm Emergency Management

Chris Calloway
cbc@chriscalloway.org
University of North Carolina
Renaissance Computing Institute

Jupyter Day Atlanta
August 13, 2016

This material is based upon work supported by the U.S. Department of Homeland Security under Grant Award Number 2015-ST-061-ND0001-01.

PyData Carolinas
http://pydata.org/carolinas2016

PyData Carolinas 2016

Home | Diversity | Venue | About | Sponsors | Schedule | Account

Downtown Durham, by James Willamor, licensed under CC-BY-SA 3.0

PyData Carolinas 2016

September 14-16, 2016

Hosted by IBM Emerging Technologies

Research Triangle Park, NC

Register

SPONSORS

IBM

RENCI

renci

About | Research | Publications | Resources | News

Quick Links

- Staff Directory
- Directions
- Careers
- Events
- NCDS
- iRODS Consortium

News

iRODS Consortium welcomes Bayer as the latest global enterprise member of the consortium

Research made easier

iRODS Consortium welcomes prestigious European university as newest member

South Big Data Hub links talented students with tech startups through new program

Blog

Want to know what's happening with RENCI researchers, research projects and events? Read our blog and stay in touch.

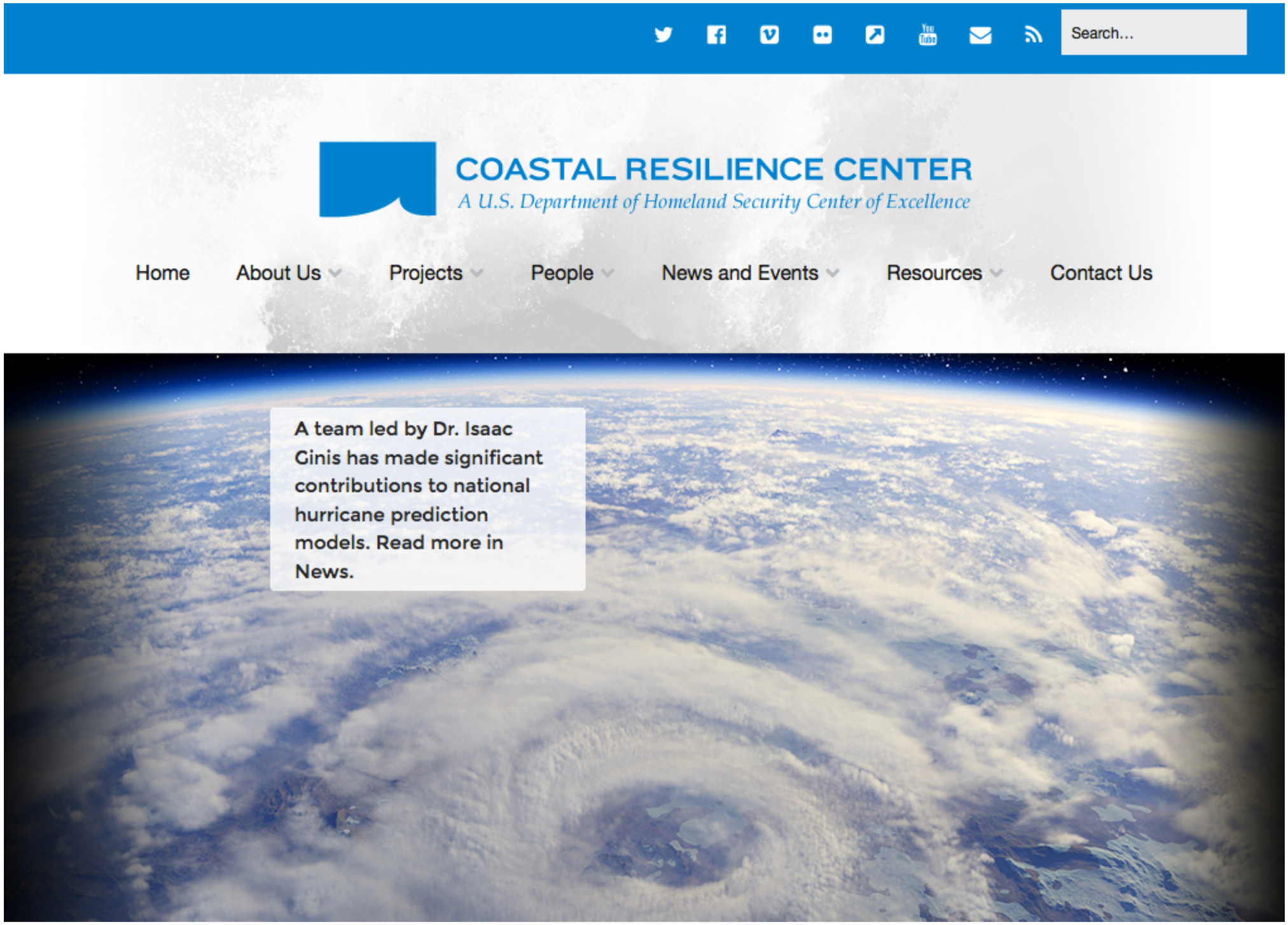
Read Our Blog

Read the iRODS Blog

Spotlight

RENCI Newsletter Signup

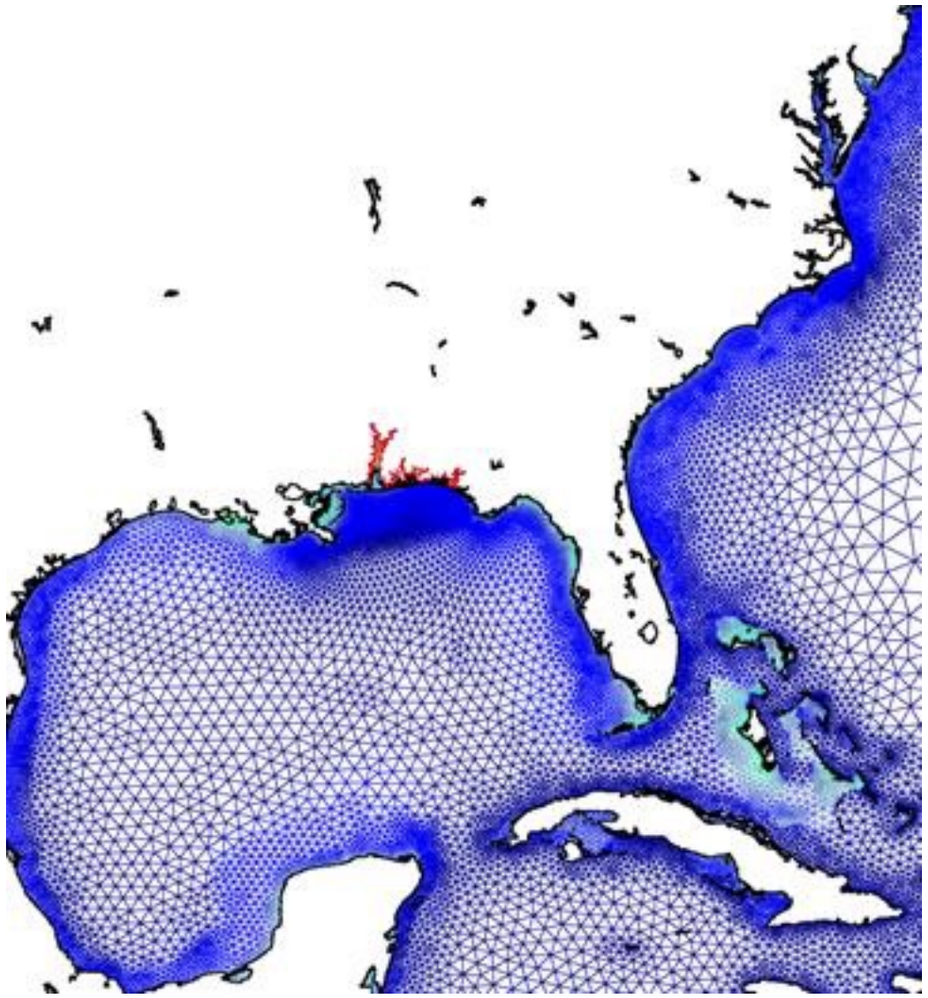
Coastal Resilience Center



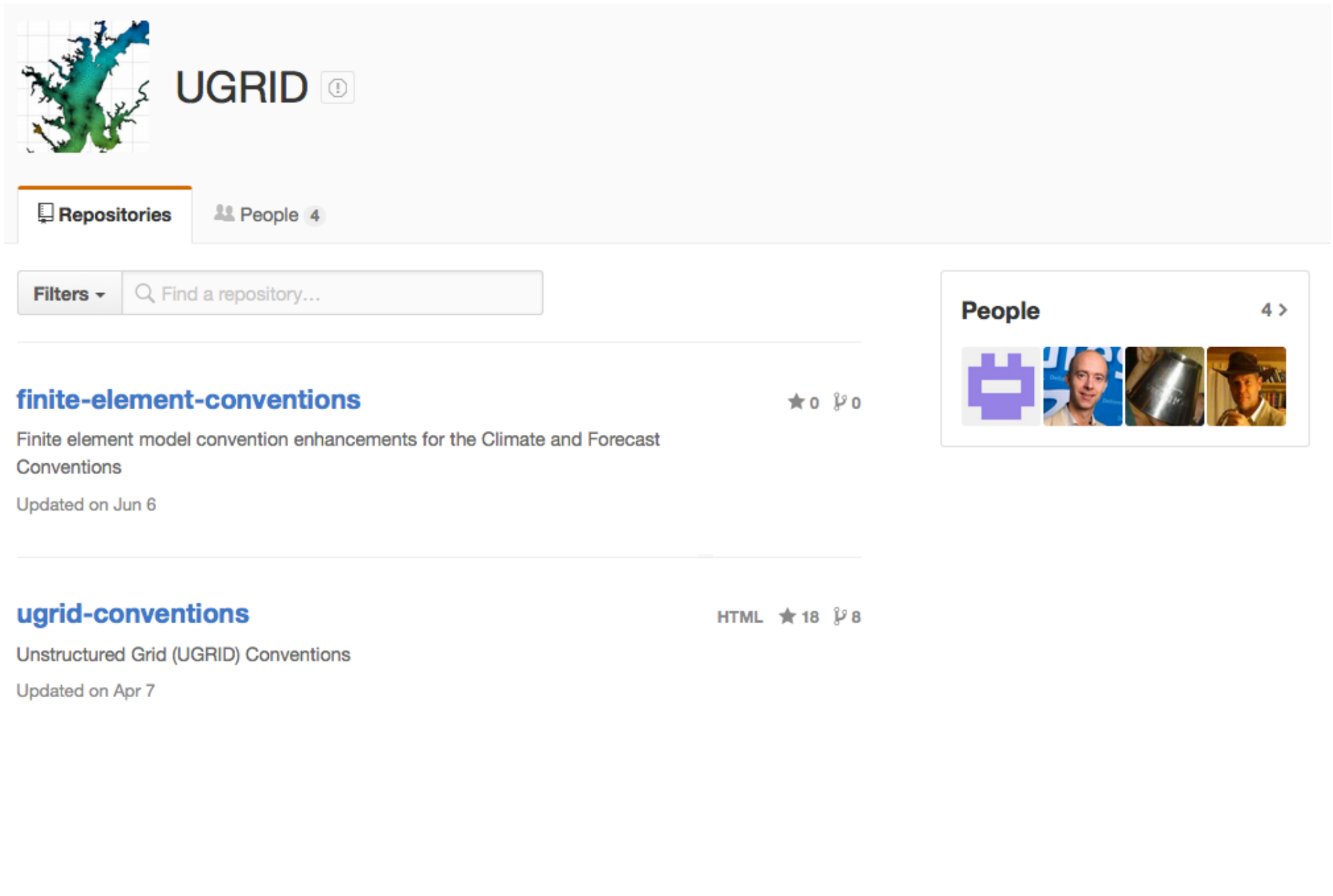
ADCIRC

ADCIRC
Community
Documentation
Related software
News
Products
ASGS
Home
Search this site
Sear
The Official ADCIRC Web Site
Latest ADCIRC storm surge forecast here
ADCIRC is a system of computer programs for solving time dependent, free surface circulation and transport problems in two and three dimensions. These programs utilize the finite element method in space allowing the use of highly flexible, unstructured grids. Typical ADCIRC applications have included:
prediction of storm surge and flooding
modeling tides and wind driven circulation
larval transport studies
near shore marine operations
dredging feasibility and material disposal studies

ADCIRC Grid



UGrid Convention



PyUgrid

pyugrid

Repositories | People 14 | Teams 1 | Settings

Filters | Find a repository... | New repository

pyugrid — Jupyter Notebook ★ 16 ⑂ 28

Handle UGRID-convention NetCDF Data Model.

Updated 2 days ago

pyugrid.github.io — HTML ★ 0 ⑂ 0

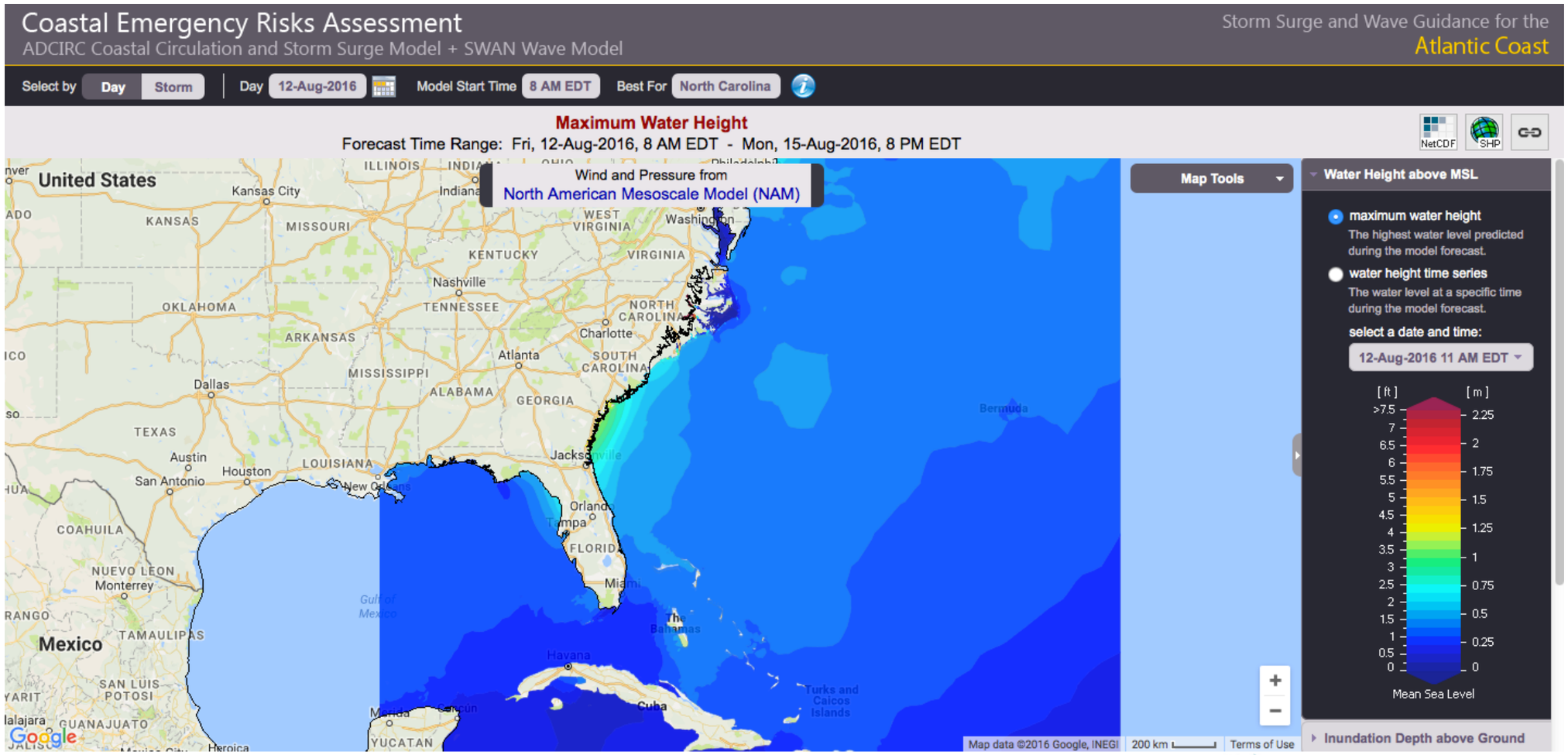
Github.io site for the pyugrid organization.

Updated on Jul 10, 2015

People 14 >

Invite someone

CERA

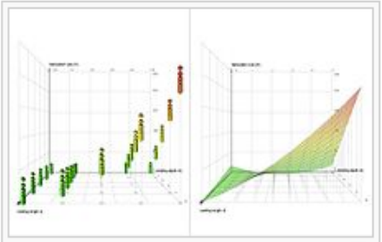

Coastal Emergency Risks Assessment
ADCIRC Coastal Circulation and Storm Surge Model + SWAN Wave Model
Storm Surge and Wave Guidance for the
Atlantic Coast
Select by
Day
Storm
Day
12-Aug-2016
Model Start Time
8 AM EDT
Best For
North Carolina
Maximum Water Height
Forecast Time Range: Fri, 12-Aug-2016, 8 AM EDT - Mon, 15-Aug-2016, 8 PM EDT
NetCDF
SHP
Wind and Pressure from
North American Mesoscale Model (NAM)
Map Tools
Water Height above MSL
maximum water height
The highest water level predicted during the model forecast.
water height time series
The water level at a specific time during the model forecast.
select a date and time:
12-Aug-2016 11 AM EDT
[ft]
[m]
>7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Mean Sea Level
Inundation Depth above Ground
United States
Kansas City
Indiana
KANSAS
MISSOURI
KENTUCKY
WEST VIRGINIA
VIRGINIA
Washington
Nashville
TENNESSEE
NORTH CAROLINA
Charlotte
OKLAHOMA
ARKANSAS
Atlanta
SOUTH CAROLINA
MISSISSIPPI
ALABAMA
GEORGIA
Dallas
TEXAS
Austin
San Antonio
Houston
LOUISIANA
New Orleans
Jacksonville
Orlando
Tampa
FLORIDA
Miami
COAHUILA
NUEVO LEON
Monterrey
TAMAULIPAS
Mexico
SAN LUIS POTOSI
GUANAJUATO
Gulf of Mexico
Bermuda
The Bahamas
Havana
Cuba
Turks and Caicos Islands
Mérida
YUCATAN
Google
Map data ©2016 Google, INEGI
200 km
Terms of Use
Contact us: email
CERA tutorial

Response Surface Method

Response surface methodology

From Wikipedia, the free encyclopedia

In statistics, **response surface methodology (RSM)** explores the relationships between several explanatory variables and one or more response variables. The method was introduced by G. E. P. Box and K. B. Wilson in 1951. The main idea of RSM is to use a sequence of designed experiments to obtain an optimal response. Box and Wilson suggest using a second-degree polynomial model to do this. They acknowledge that this model is only an approximation, but use it because such a model is easy to estimate and apply, even when little is known about the process.

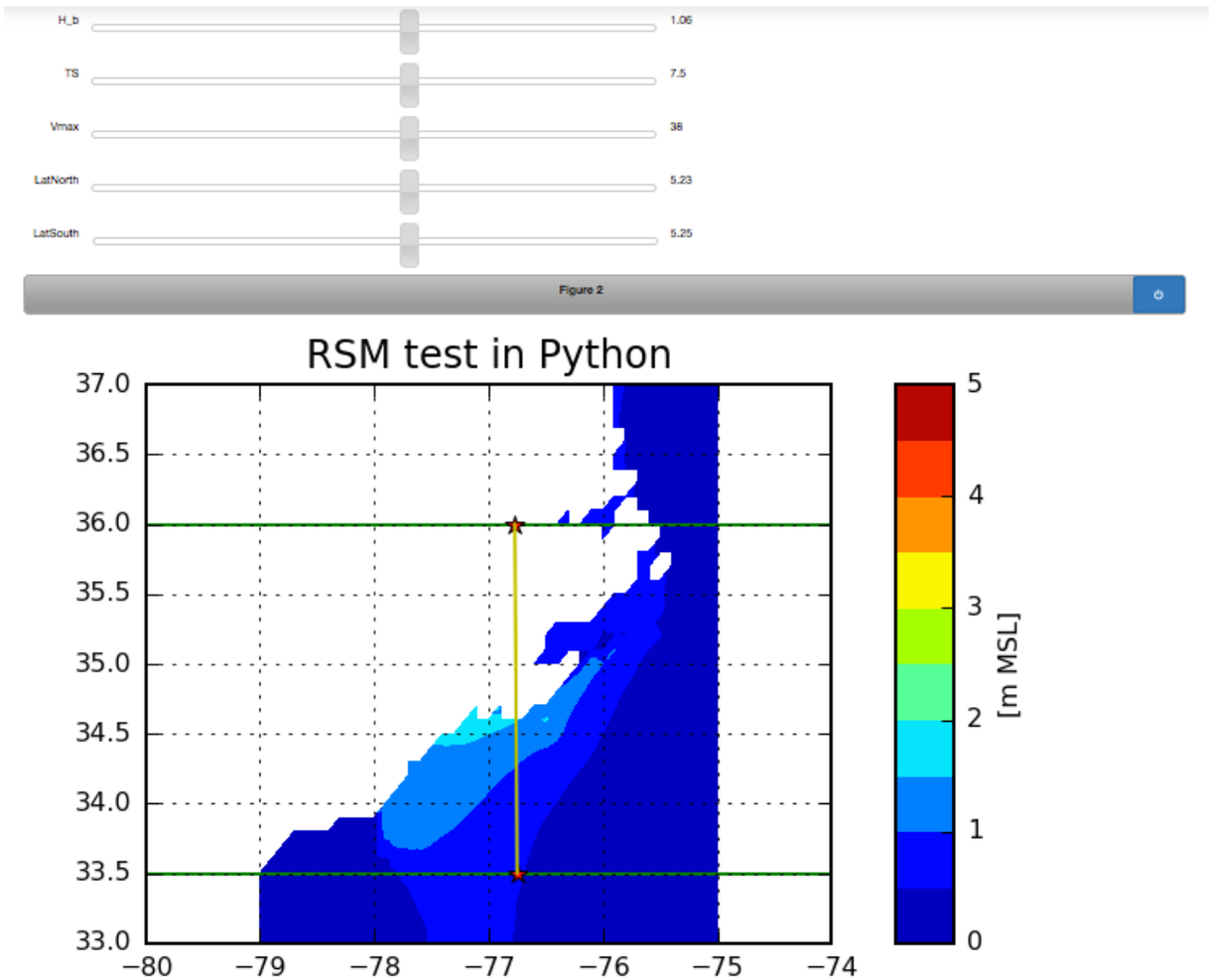


Designed experiments with full factorial design (left), response surface with second-degree polynomial (right)

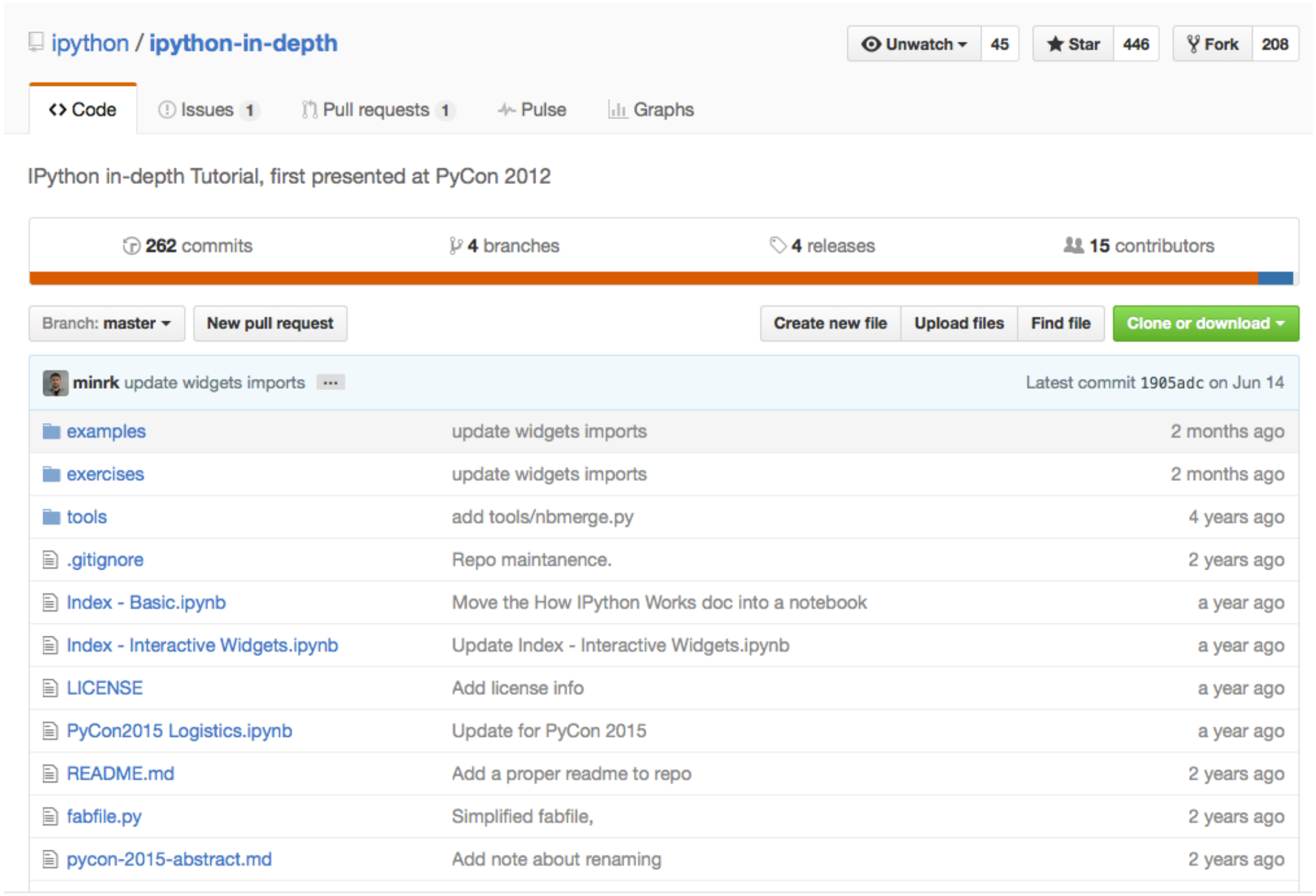
Contents [hide]

1 Basic approach of response surface methodology
2 Important RSM properties and features
3 Special geometries
  3.1 Cube
  3.2 Sphere
  3.3 Simplex geometry and mixture experiments
4 Extensions
  4.1 Multiple objective functions
5 Practical concerns
6 See also
7 References
  7.1 Historical
8 External links

Notebook Prototype



IPython in Depth



ipywidgets Interactive

In [11]:
```
#from __future__ import print_function # for python 2
from ipywidgets import interact, interactive, fixed
import ipywidgets as widgets
from IPython.display import clear_output, display, HTML
```

In [12]:
```
#rmw,H_b,TS,Vmax,LatNorth,LatSouth
w=interactive(master, \
        rmw     =widgets.FloatSlider(min=p1min,max=p1max,step=dp1,value=rmw),\
        H_b     =widgets.FloatSlider(min=p2min,max=p2max,step=dp2,value=H_b),\
        TS      =widgets.FloatSlider(min=p3min,max=p3max,step=dp3,value=TS),\
        Vmax    =widgets.FloatSlider(min=p4min,max=p4max,step=dp4,value=Vmax),\
        LatNorth=widgets.FloatSlider(min=p5min,max=p5max,step=dp5,value=LatNorth),\
        LatSouth=widgets.FloatSlider(min=p6min,max=p6max,step=dp6,value=LatSouth));
```

mybinder.org

Turn a GitHub repo into a collection
of interactive notebooks

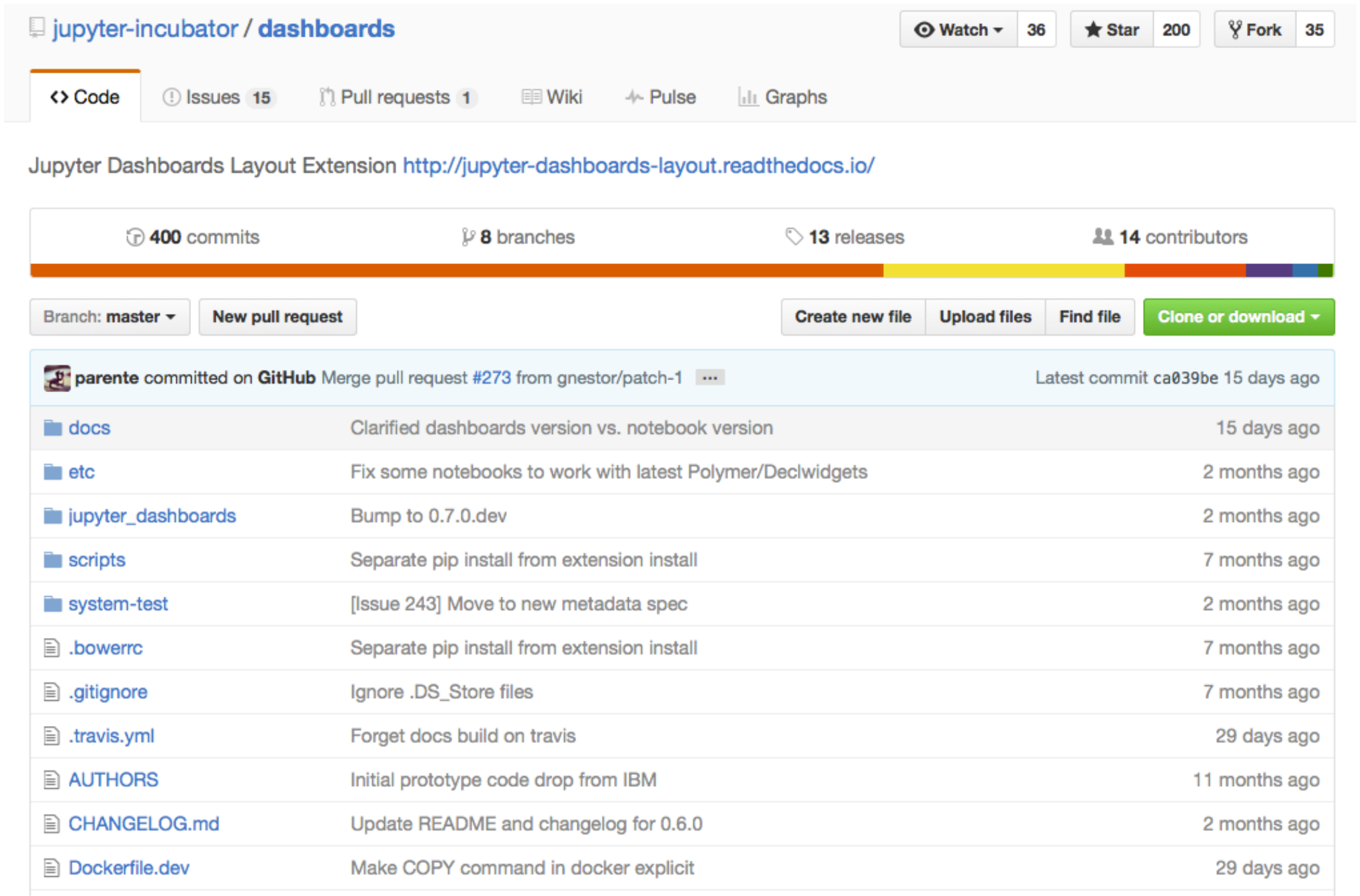
Have a repository full of Jupyter notebooks? With Binder, you can add a badge that opens those notebooks in an executable environment, making your code immediately reproducible by anyone, anywhere.

100% free and open source. Browse examples. Read the FAQ.

Build a repository

submit

Jupyter Dashboards



Sylvain Corlay

Overview | Repositories | Public activity

Follow | Block or report

Sylvain Corlay
SylvainCorlay

Applied Mathematician (Quant at **@Bloomberg**, Adjunct faculty at **@Columbia** and **@NYU**). Open Source Developer (Contributor to **@Jupyter**, Scientific Python)

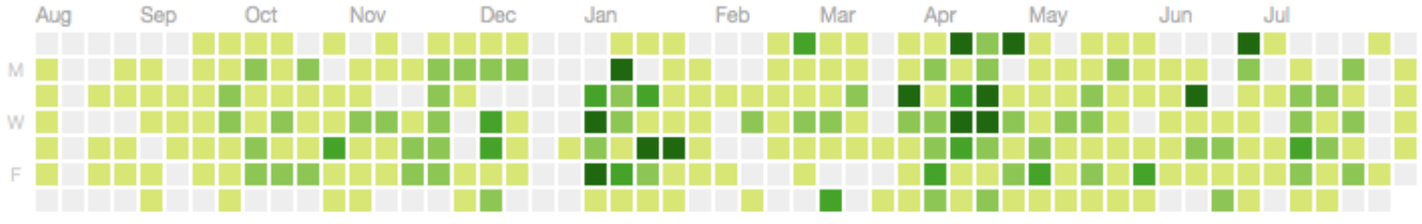
Bloomberg LP
New York
http://www.proba.jussieu.fr/page...
Joined on Sep 22, 2012

105 Followers | **73** Starred | **77** Following

Popular repositories

- **PyDataLondon2016** — PyData London 2016 material — 21 ★
- **fly-binder** — 1 ★
- **jupyter-matplotlib** — Interactive Matplotlib Jupyter Widget — 1 ★
- **bqplot-binder** — Deployment of bqplot on mybinder.org — 1 ★
- **ipython-flightwidgets** — Flight attitude and compass widgets — 1 ★

1,945 contributions in the last year



Summary of pull requests, issues opened, and commits. Learn how we count contributions.

Less More

ipympl

SylvainCorlay / **jupyter-matplotlib**

Watch 3 | Star 1 | Fork 3

Code | Issues 1 | Pull requests 0 | Wiki | Pulse | Graphs

Interactive Matplotlib Jupyter Widget

5 commits | **1** branch | **1** release | **1** contributor

Branch: **master** | **New pull request** | **Create new file** | **Upload files** | **Find file** | **Clone or download**

SylvainCorlay Clear output — Latest commit `d63b05d` a day ago

examples	Clear output	a day ago
ipympl	Release 0.0.2 to require matplotlib 2.0.0b3	23 days ago
js	Initial commit: ipympl Jupyter extension	2 months ago
.gitignore	Initial commit: ipympl Jupyter extension	2 months ago
MANIFEST.in	Initial commit: ipympl Jupyter extension	2 months ago
README.md	Update Readme	23 days ago
RELEASE.md	Initial commit: ipympl Jupyter extension	2 months ago
setup.cfg	Initial commit: ipympl Jupyter extension	2 months ago
setup.py	Release 0.0.2 to require matplotlib 2.0.0b3	23 days ago

ipympl

- Python 3
- Requires conda-forge
- pip install
- Requires matplotlib 2.0.0b3 from condo-forge
- Requires conda-forge version of libpng

Demo

RSM Implementation

- Requires basemap
- Requires basemap hires data
- Requires owslib

Next Steps

- Use Dashboard Bundler/Server
- Use ipyleaflet instead of ipympl

Code

cbcunc / **modnot**

Unwatch 1 | Star 0 | Fork 0

Code | Issues 0 | Pull requests 0 | Wiki | Pulse | Graphs | Settings

No description or website provided. — Edit

37 commits | **1** branch | **0** releases | **2** contributors

Branch: **master** | **New pull request** | **Create new file** | **Upload files** | **Find file** | **Clone or download**

cbcunc committed on **GitHub** Delete environment.yml — Latest commit 96169e5 7 hours ago

.gitignore	updated ignore file	4 months ago
README.md	Create README.md	7 hours ago
RSM-ipympl-basemap.ipynb	Add DHS acknowledgement.	a day ago
central_ckv.py	switched to RSM example for Binder test	5 months ago
license.md	Create license.md	7 hours ago
notenv.sh	Add nbextension enable and install for ipympl.	2 days ago
temp3.mat	switched to RSM example for Binder test	5 months ago

Questions?