

# SW REDI Program and the Coned Tool



Josh Bryant

# Outline

- SW REDI Program
  - Trained NASA personnel as well as and teachers space phenomena and forecasting
- Coned Tool
  - Tool used to analyze halo CMEs directed towards Earth
  - New version testing and implementation



Space Weather Forecast

Yesterday Today Tomorrow

## LEARN THE BASICS OF SPACE WEATHER

<http://ccmc.gsfc.nasa.gov/support/SWREDI/swredi.php>



Diagram illustrating space weather effects on Earth and satellites. Labels include: Energetic Electrons, Damage to Satellites Electronics, GPS Signal Scintillation, Solar Flare Protons, Radiation Effects on Aircraft, Geomagnetically Induced Currents in Power Systems, Induced Effects in Submarine Cables, and Telluric Currents in Pipelines.



Scientist



Students



PHYS 562:  
Space Weather I  
Space Physics  
Fall 2013

**APPLY NOW**

Registration Deadline:  
August 30, 2013

The foundation of this unique course on space weather includes the Integrated Space Weather Analysis system (<http://swa.gsfc.nasa.gov>), space environment models installed at the CCMC (<http://ccmc.gsfc.nasa.gov>), and the operational experience of the SWRC forecasting team (<http://swrc.gsfc.nasa.gov>).

The course is mainly geared towards those motivated undergraduate or graduate students who either seek to be independent space weather forecasters or those who seek to perform space weather related research. However, the course may be of interest also for scientists and others who are interested in developing a basic knowledge regarding space weather.

The course is listed in the CUA course catalog and can be attended by students from any member university within the Consortium of Universities of the Washington Metropolitan Area (<http://www.consortium.org/consortium/index.cfm>).

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# SW REDI Program Goals

- Promote space environment awareness as an important component of the new millennium core education
- Facilitate establishment of space weather programs at universities worldwide
- Provide undergraduate student internship opportunities at CCMC/SWRC to develop skills beneficial for any future career pursuit.

# SW REDI Bootcamp

- Two week intensive training which covers all areas of space weather
- Daily lectures
- Graded Assessments



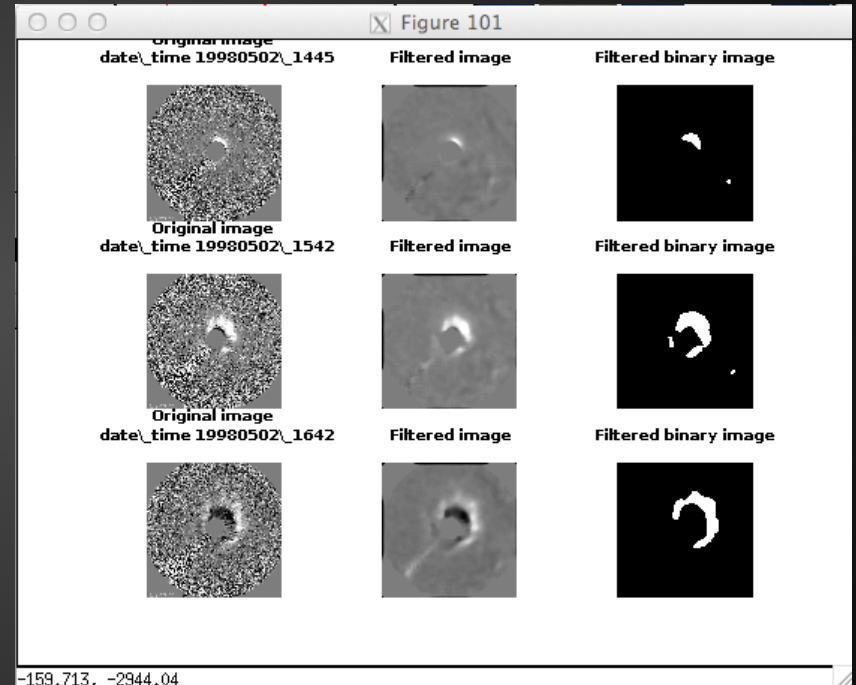
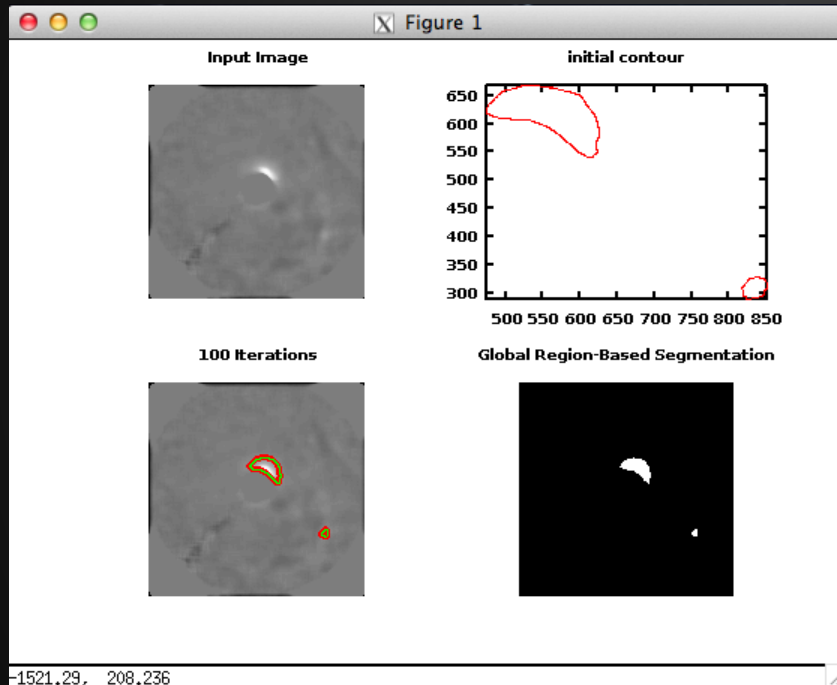
# Old Coned Tool

```
jbryant — jbryant@uhurub:~ — ssh — 80x24
5.82 [Rs], v 409.47 [km/s]
(43/50) Inverted param.: lon 1.55 [deg], lat -1.83 [deg], omega 27.78 [deg], x0
11.69 [Rs], v 760.91 [km/s]
^[A(44/50) Inverted param.: lon 2.66 [deg], lat -3.08 [deg], omega 36.86 [deg],
x0 8.11 [Rs], v 528.01 [km/s]
(45/50) Inverted param.: lon 0.97 [deg], lat -1.15 [deg], omega 40.88 [deg], x0
7.42 [Rs], v 485.54 [km/s]
(46/50) Inverted param.: lon 4.32 [deg], lat -5.39 [deg], omega 48.48 [deg], x0
5.41 [Rs], v 335.77 [km/s]
(47/50) Inverted param.: lon 4.01 [deg], lat -4.89 [deg], omega 32.20 [deg], x0
9.16 [Rs], v 620.41 [km/s]
(48/50) Inverted param.: lon 1.62 [deg], lat -1.95 [deg], omega 16.54 [deg], x0
19.94 [Rs], v 1220.53 [km/s]
(49/50) Inverted param.: lon 1.61 [deg], lat -1.99 [deg], omega 30.00 [deg], x0
10.77 [Rs], v 646.38 [km/s]
(50/50) Inverted param.: lon 1.48 [deg], lat -1.77 [deg], omega 28.30 [deg], x0
11.39 [Rs], v 769.21 [km/s]

20100403114200, lon. 003 [deg], lat. -03 [deg], v 0661 [km/s], omega 30 [deg],
x0 10 [Rs], t@21.5Rs 2010-04-03 15:04 [yyyy-mm-dd HH:MM]
  RUNCONEDMAIN: /home2/jbryant/rt_cone_ctl_file_201308051105 saved.

[jbryant@uhurub ~]$
```

# New Coned Tool





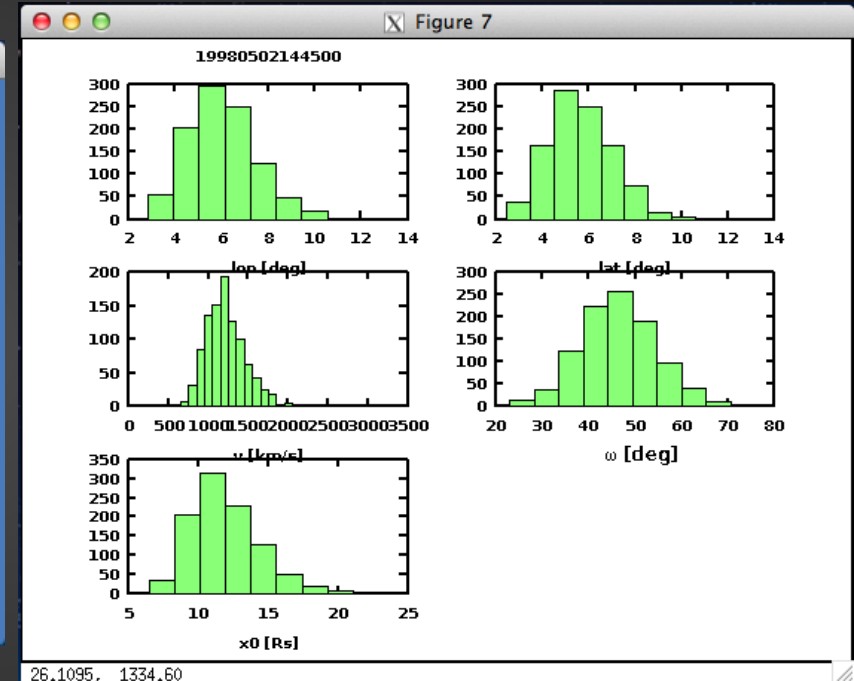
# New Coned Tool

```
jbryant — jbryant@uhurub:~/CONED_NEXT — ssh — 80x24
date_time 19980502\_1642
}
labels =
{
  [1,1] = Original image
  date\_time 19980502\_1642
}
CONEDMAIN: Number of points used for Image 3 CME Number 1: 52298
CME Number 1
CME: 1.000000

Median Values:
19980502144500, lon. 006 [deg], lat. 006 [deg], v 1185 [km/s], omega 46 [deg],
x0 12 [Rs], t@21.5Rs 1998-05-02 16:21 [yyyy-mm-dd HH:MM]

Mean Values:
19980502144500, lon. 006 [deg], lat. 006 [deg], v 1226 [km/s], omega 46 [deg],
x0 03 [Rs], t@21.5Rs 1998-05-02 16:21 [yyyy-mm-dd HH:MM]

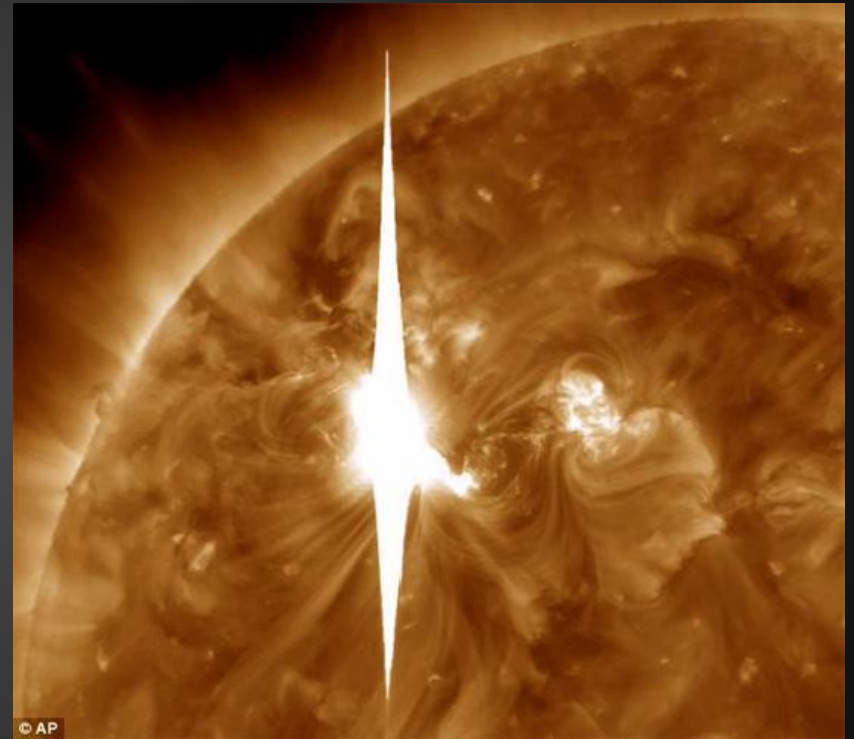
Standard Deviation Values:
19980502144500, lon. 001 [deg], lat. 001 [deg], v 0262 [km/s], omega 08 [deg],
x0 03 [Rs], t@21.5Rs 1998-05-02 16:21 [yyyy-mm-dd HH:MM]
fig = 102
octave:2>
```



26,1095, 1334,60

# Future Work

- Fully implement new version
- Flare location option
- Multiple CME option





# Thank You!

- Dr. Antti Pulkkinen
- Dr. Ekaterina Verner
- Matthew Jacobs
- CCMC/SWRC
- The Catholic University of America