Department Computing

Alex Dittmann

ASTR 695, Autumn 2021

Types of resources

People
Mark Wolfire, Kevin Rauch, Peter Teuben

Wiki
http://www.astro.umd.edu/cgi-bin/twiki/view/AstroUMD

Software
Dept. licenses (IDL, Mathematica, Matlab, etc.)
Astromake: simplified installation of common astro. software
e.g. ds9, pgplot

Hardware
Yorp cluster
Deepthought2, Deepthought3/Zaratan

People

- See Kevin (software) to get your astronomy account

- See Mark (hardware) for, e.g. laptop ethernet access

- Use help@astro.umd.edu to contact both

Software
From N-body dynamics to signal processing
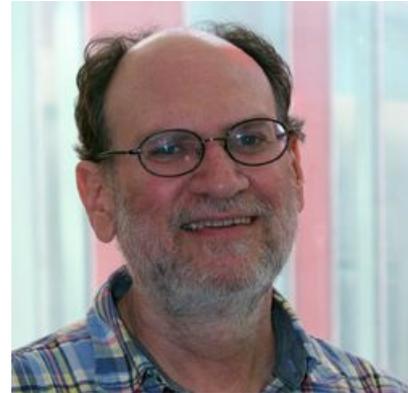
Hardware
ISM research

Certified wizard

More people

- Peter Teuben:
  maintains the backup system + astromake, can help with Linux /Mac laptops.

- Derek Richardson:
  go-to for deepthought + bird stuff

Astronomy Computing Committee:

Massimo Ricotti (Chair)
Olivia Dent
Alex Dittmann (Grad student rep.)
Marc Pound
Kevin Rauch

Anne Raugh
Xi Shao
Peter Teuben
Dennis Wellnitz
Mark Wolfire

If you have issues, concerns, and/or ideas related to computing in our department, please contact any member of the ACC. We'll be happy to hear from you!

The astronomy twiki

- General department resource
  - Warning: some pages are outdated

- Overview:
  https://www.astro.umd.edu/twiki/bin/view/AstroUMD/OverView

- Hardware:
  https://www.astro.umd.edu/twiki/bin/view/AstroUMD/HardWare

- Software:
  https://www.astro.umd.edu/twiki/bin/view/AstroUMD/SoftWare

The astronomy network

- Most of the department computers are networked together
  - Can access files on any computer from any computer
  - Large collection of linux machines

- Can access network remotely through ssh
  - e.g. ssh username@terra.astro.umd.edu

- Starting mid-semester, need VPN for off-campus access
  - https://terpware.umd.edu/Linux/Title/4010

The astronomy network

- Need an astronomy account to use

- Useful for sharing data with colleagues

- Remote/networked locations start with /n/

- Backed up regularly

- Dept. can provide a computer to students
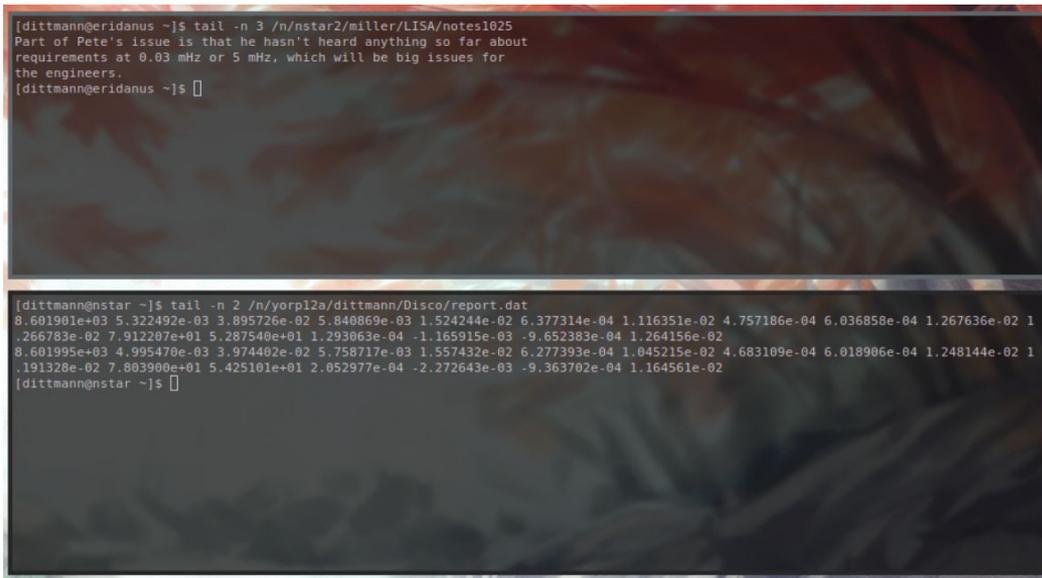

```
[dittmann@eridanus ~]$ tail -n 3 /n/nstar2/miller/LISA/notes1025
Part of Pete's issue is that he hasn't heard anything so far about
requirements at 0.03 mHz or 5 mHz, which will be big issues for
the engineers.
[dittmann@eridanus ~]$
```

```
[dittmann@nstar ~]$ tail -n 2 /n/yorp12a/dittmann/Disco/report.dat
8.601901e+03 5.322492e-03 3.895726e-02 5.840869e-03 1.524244e-02 6.377314e-04 1.116351e-02 4.757186e-04 6.036858e-04 1.267636e-02 1
.266783e-02 7.912207e+01 5.287540e+01 1.293063e-04 -1.165915e-03 -9.652383e-04 1.264156e-02
8.601995e+03 4.995470e-03 3.974402e-02 5.758717e-03 1.557432e-02 6.277393e-04 1.045215e-02 4.683109e-04 6.018906e-04 1.248144e-02 1
.191328e-02 7.803900e+01 5.425101e+01 2.052977e-04 -2.272643e-03 -9.363702e-04 1.164561e-02
[dittmann@nstar ~]$
```

Top: accessing text files on Cole's computer (nstar) from mine (eridanus)

Bottom: accessing files on yorp from Cole's computer

YORP

- Cluster of ~20 computers

- Can ssh in from the network

- Good for mid-sized jobs

- Reservation/honor system

name	nodes	cores	processor set per node	RAM	disk
yorp	1	8	Intel Xeon E5420 2.5 GHz (2CPU 4core)	8 GB	2 TB
yorp01-04	4	32	AMD Opteron 6380 2.5 GHz (2CPU 16core)	64 GB	1.5 TB
yorp05	1	12	Intel Xeon X5670 2.9 GHz (2CPU 6core)	24 GB	1 TB
yorp06-09	4	12	Intel Xeon X5670 2.9 GHz (2CPU 6core)	24 GB	4 TB
yorp10	1	24	AMD Opteron 6180 SE 2.5 GHz (2CPU 12core)	64 GB	2 TB
yorp11-17	7	32	AMD Opteron 6284 SE 2.7 GHz (2CPU 16core)	64 GB	2.3 TB
yorp18-20	3	32	AMD Opteron 6380 2.5 GHz (2CPU 16core)	64 GB	1.5 TB

```
[dittmann@eridanus data]$ ssh yorp
Please sign up for yorp time by editing /etc/motd
Indicate how many threads you want, and for what days.

!!! No computations should be run on the yorp queen. !!!

yorp01 [32 threads] - jdema      (7/1 -  8/30, 32 threads)
yorp02 [32 threads] - jdema      (7/1 -  8/30, 32 threads)
yorp03 [32 threads] - thuard     (7/16 - 7/30, 32 threads)
yorp04 [32 threads] - imholt     (8/10 - 9/30 32 threads)
yorp05 [24 threads] - kleidig    (8/30 - 9/30, 24 threads)
yorp06 [24 threads] - hagrusa    (8/2 - 9/31, 24 threads)
yorp07 [24 threads] - hagrusa    (8/2 - 9/31, 24 threads)
yorp08 [24 threads] - hagrusa    (8/2 - 9/31, 24 threads)
yorp09 [24 threads] - imholt     (8/31 - 9/31, 24 threads)
yorp10 [24 threads] - imholt     (06/11 - 9/30, 24 threads)
yorp11 [32 threads] - dittmann   (8/31 - 9/30, 32 threads)
yorp12 [32 threads] - dittmann   (1/05 - 9/30, 32 threads)
yorp13 [32 threads] - dittmann   (5/18 - 9/30)
yorp14 [32 threads] - dittmann   (1/05 - 9/30, 32 threads)
yorp15 [32 threads] - OFFLINE/UNAVAILABLE
yorp16 [32 threads] - cosinga    (8/27-9/30, 32 threads)
yorp17 [32 threads] - gsryan     (12/09 -  8/31, 32 threads)
yorp18 [32 threads] - gsryan     (12/09 -  8/31, 32 threads)
yorp19 [32 threads] - anyamischel ( 7/1 - 8/1 , 32 threads)
yorp20 [32 threads] - gsryan     (4/20 - 8/31, 32 threads)

This machine runs the CentOS 8 operating system.
Report hardware/software issues to help@astro.umd.edu.
Last login: Wed Sep  1 13:24:56 2021 from 129.2.14.33
[dittmann@yorp ~]$ 
```

Notable computers

- horizon:
  ~4TB of RAID storage available per user (for now)

- lma: 32 cores, lots of RAM
  - Primarily for big ALMA data analyses
  - I'm not sure about *general* use

- galileo/dynamics have GPUs

  - Ask Massimo for permission before using galileo

University Clusters

- Use university/TerpConnect account
- Deepthought2
  - 9840 cores, to retire early next year
  - Department has ~1.2 million core hours each month
  - Use slack to coordinate usage
- Zaratan (the cluster formerly known as Deepthought3)
  - 33280-50000 cores, 80 GPUs
  - Dept. allocation TBD

- BlueCrab
  - write proposal for time
  - not too competitive

Until they make an actual logo

General software notes

- No admin access on dept. Computers

- When installing from source, use ./configure --prefix=*directory* where applicable

- With pip, use pip install --user *package* to install just for your account

- See https://www.astro.umd.edu/twiki/bin/view/AstroUMD/SoftWare

Tips: (bash/csh)rc files

- Useful for setting up shortcuts

- Runs automatically on login

- Custom settings on different dept. computers
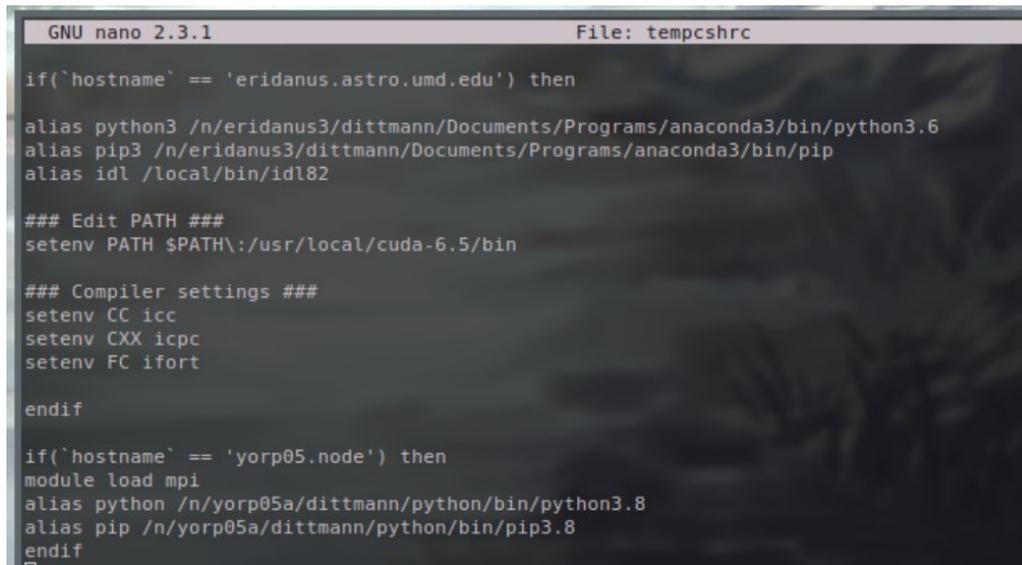

```
GNU nano 2.3.1                                    File: tempcshrc

if(`hostname` == 'eridanus.astro.umd.edu') then

alias python3 /n/eridanus3/dittmann/Documents/Programs/anaconda3/bin/python3.6
alias pip3 /n/eridanus3/dittmann/Documents/Programs/anaconda3/bin/pip
alias idl /local/bin/idl82

### Edit PATH ###
setenv PATH $PATH\:/usr/local/cuda-6.5/bin

### Compiler settings ###
setenv CC icc
setenv CXX icpc
setenv FC ifort

endif

if(`hostname` == 'yorp05.node') then
module load mpi
alias python /n/yorp05a/dittmann/python/bin/python3.8
alias pip /n/yorp05a/dittmann/python/bin/pip3.8
endif
```

An excerpt from my .cshrc file

Tips: cloud storage

- UMD provides storage through Box and Google Drive

- Unlimited storage on drive
    - Collaboration, non-sensitive information

- Box currently offers unlimited storage
    - Will enforce (unspecified) limits starting July 2022

Tips: websites

- Guide on TWiki:
  https://www.astro.umd.edu/twiki/bin/view/AstroUMD/WebPages

- Everyone gets a default page

- Can also link to a personal page

- Good for hosting/sharing files

Tips: websites

Can host on the astro website

or link to a page hosted externally

Tips: off-campus journal access

- Campus library has handy browser plugin:
  https://lib.guides.umd.edu/c.php?g=436890&p=2978436

- Can just do a web search for something like
  umd library journal access

Thanks for listening

- Questions?

- Demo requests?