Role of the Post-Graduate student

Carlton Baugh

Astronomy Postgraduate Course Director

Aims:

- overview of the astronomy post-graduate course
- basic guidance on what you should expect in your PhD
- what is expected of you

Astronomy at Durham

Durham University

Institute for Computational Cosmology
Centre for Extragalactic Astronomy
Centre for Advanced Instrumentation

- **32 permanent members of staff,**
- **4 long-term research fellows**
- **around 100 postdocs, students, and support staff.**

PG course: structure, lectures, and course work

- **Astro Lectures:**
  - typically 1 hour each, 2 per day
  - 9am-11am in OCW017 on most days of the week
  - Some afternoon classes/workshops
  - check google calendar

https://calendar.google.com/calendar/embed?src=hva481hhsulagra8k29opevs54%40group.calendar.google.com&ctz=Europe%2FLondon

(Also available from: http://astro.dur.ac.uk/index.php?content=CEA/Postgraduate/Course)

- Google calendar gives lecture course name, lecturer and room
- Google calendar entries marked "Astro PG OCW017" are spare lecture slots that have not been allocated.

- **Aim:** basic research and specific skills needed for PhD and give wider background - become an independent researcher

More about lecture courses & assessment

- **Research skills: general computing, statistics, programming, high-performance computing, instrumentation, data reduction, scientific paper writing, evaluating scientific papers**

- **Science lecture courses cover broad range of astrophysics from stars to cosmology**
  - Coursework is set for every lecture series
  - should typically take ~3 hours of your time
  - Aim is to give you grounding in key principals in astrophysics

Computing

- Basic computing & local system
- Programming workshop: **Python**
- **Introduction to COSMA**
- Workshops: choose **Data Reduction** or **High Performance Computing MSc lectures**
- Scientific computing: python & compiled language: lectures and exercises

Python self study course

- Uses course designed by ARCHER for Durham.
- http://www.archer.ac.uk/training/course-material/2018/09/scipy-durham/index.php
- Self-study: work through L01-L04
- Drop in sessions Weds 9th Oct 9am-12 in OCW108 (with laptop) or Ph216 (to use desktop) (Also 10-11, 10th & 11th in OCW017)
- Astro PhDs – need to get exercises signed off

Astrophysics PG courses

(these should be followed by MSc students doing astro specialisation)

Michaelmas term:

- Stellar populations
- Stellar structure
- Galaxy clusters
- Black holes
- High-z universe
- Gravitational lensing
- Milky Way
- Active Galactic Nuclei
- Cosmology
- Large-scale structure
- Interstellar medium/intergalactic medium (+workshop)

Astrophysics PG courses

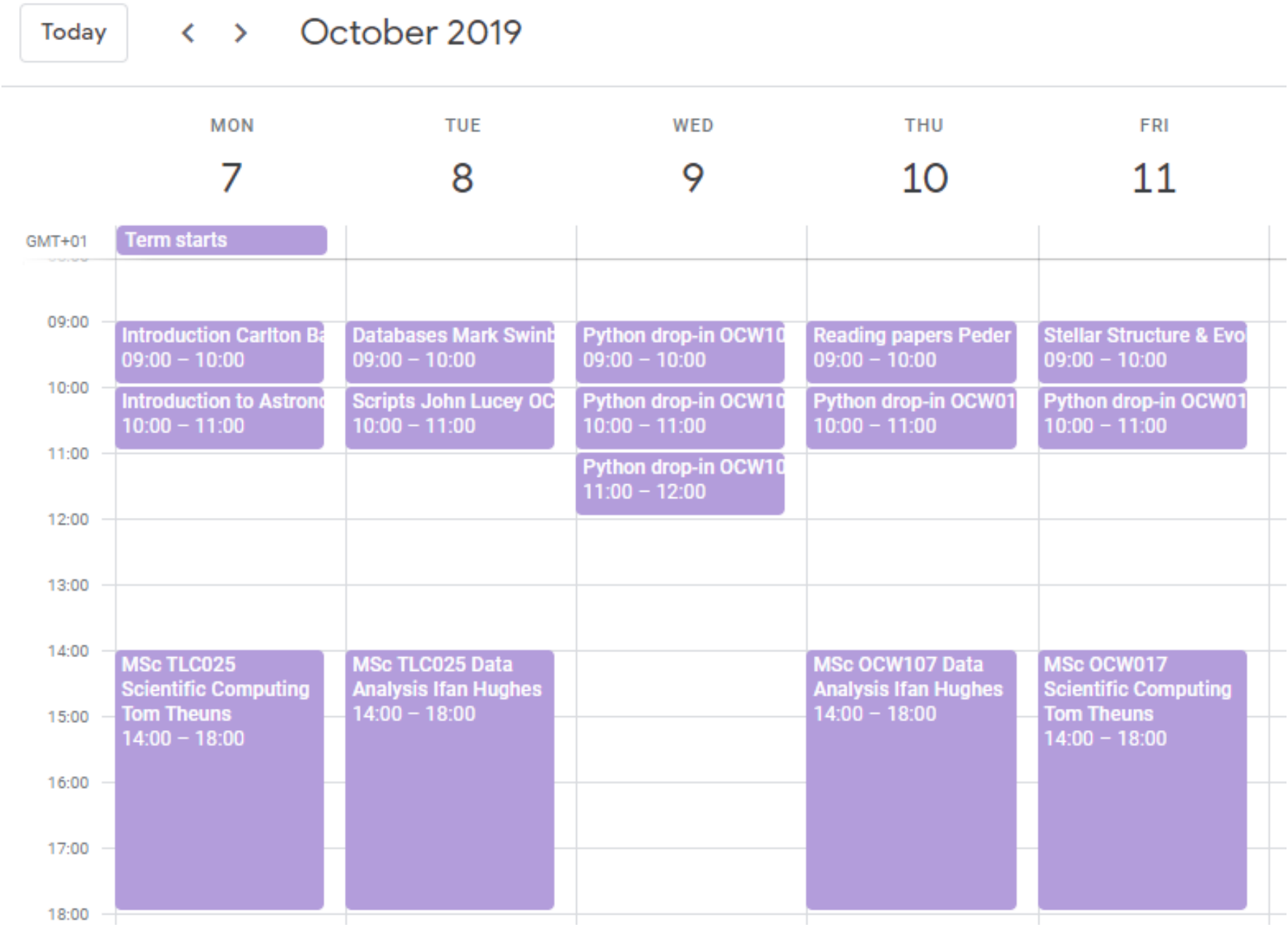
(these should be followed by MSc students doing astro specialisation)

Epiphany term:

- Stellar dynamics
- Galaxy formation
- Simulations & modified gravity
- Astrostatistics

MSc lectures

- Term 1:
- Data Analysis – Ifan Hughes – compulsory
- Scientific computing – Tom Theuns – strongly encouraged
- Machine learning – Daniel Maitre – strongly encouraged
- High Performance Computing – Tobias Weinzierl – for theorists/simulators



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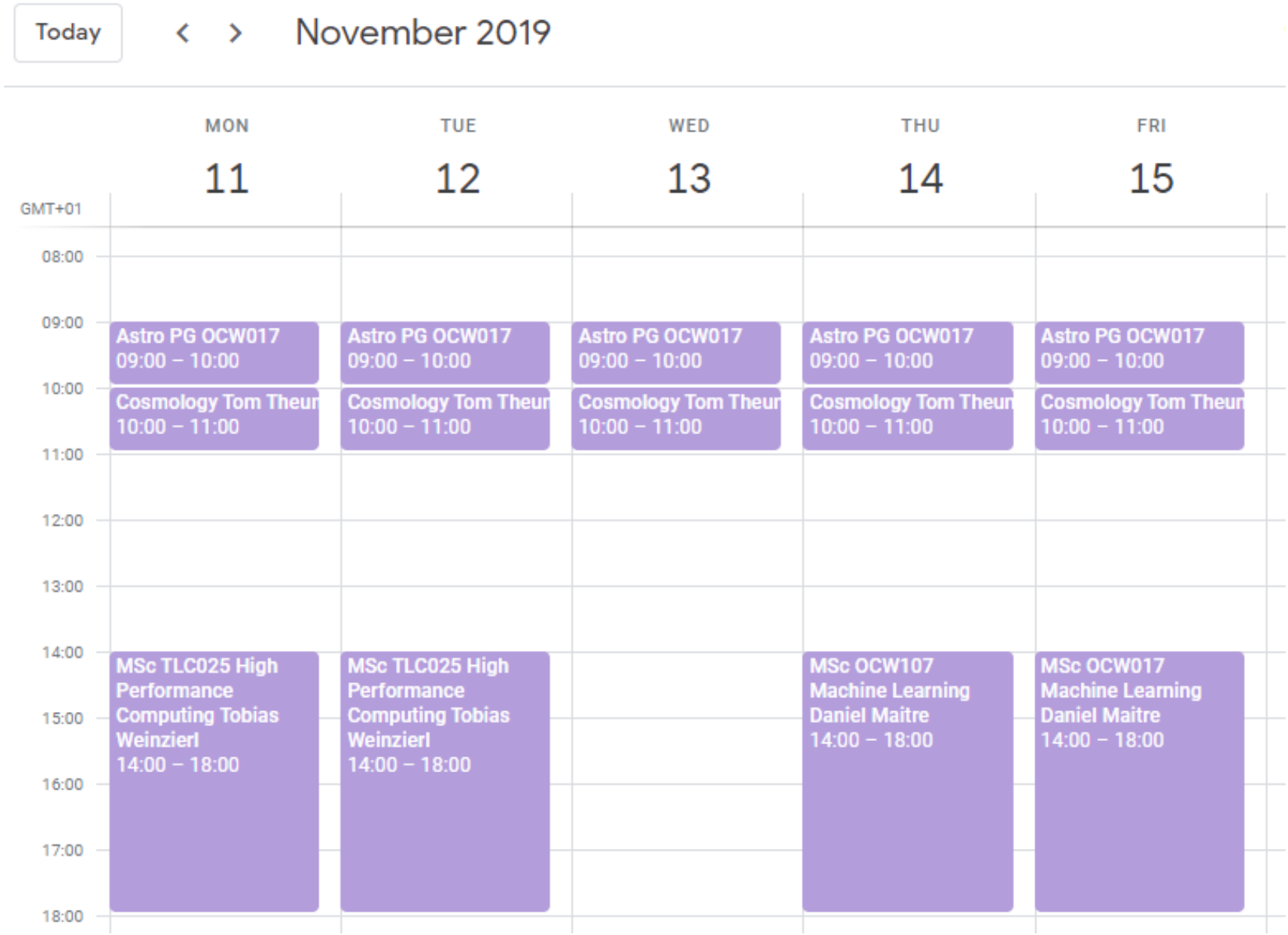
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Astro PG OCW017
09:00 – 10:00
Cosmology Tom Theur
10:00 – 11:00
MSc TLC025 High Performance Computing Tobias Weinzierl
14:00 – 18:00
MSc OCW107 Machine Learning Daniel Maitre
14:00 – 18:00
MSc OCW017 Machine Learning Daniel Maitre
14:00 – 18:00

Course Assessment: critique, talk, progression report and viva

- **Essay/critique**
  - ~2500 word critique of opposing studies - designed to develop your science evaluation skills and also your scientific writing skills
    - Will have lecture on scientific writing skills before the essay is set
  - ~12 min presentation of the critique with 3 min of questions

- **Friday lunchtime talk** (~20 mins) on your research towards the end of the first year

- **Progression report and viva (towards end of year)**
  - ~5000 word report on your research to date - background material, techniques, and results
  - ~30-45 min oral defence of your report with 2 examiners

- **Progression into second year is dependent on**

  (1) passing the post-graduate course and completing the course work

  (2) successfully completing your progression report and viva

Astro-PG Course Assessment: critique, talk, progression report and viva

Critique and talk:

- 2nd term
- 2nd March – deadline for submitting draft to supervisor
- 13th March – deadline for final draft
- 20th March – talks

Progression report:

- 5000 word report
- 15th June – deadline for submitting draft to supervisor
- Supervisor arranges examiners, date for viva and date for final submission – before 31st July
- Process to be completed in advance of university progression deadline 31st August

Weekly events

Expected to attend:

- Wednesday seminars (/CfAI seminars)
  - 3 pm seminar
  - Coffee post seminar
  - Student journal club: Weds 11am
  - Opportunity to go to lunch (dinner) with speaker
- Friday lunchtime talks (internal speakers)
- 1st year astro-ph journal club – Mondays 2nd & 3rd terms
- Monday 1pm: a series of events organised in succession in loop: All-astro lunch (OCW 017), Galform lunch (OCW226), Theory lunch (OCW 017), Galform lunch (OCW226),

Other events:

- arXiv journal club (every day 10.45 OCW Level 1)
- Wednesdays 11 – student journal club
- For full list see: http://icc.dur.ac.uk/index.php?content=Events/InterestGroups

Other training opportunities

- All students complete a Training Needs Analysis with supervisor
- Identify training needs beyond those met by PG course
- Centre for Academic, Researcher and Organisation Development (CAROD)
- HPC/Fortran – Hamilton/CIS
- https://www.dur.ac.uk/cis/training/courses

PG research: some of the key skills

- **Problem solving,** which you will develop. Do not feel intimidated about asking others (students/PDRAs/staff) for help!
  - Achieve a balance between being independent and seeking advice when necessary
  - Achieve a good relationship with your supervisor: different supervisor/student combinations will have different approaches - work out what works for you both!
- **Presenting your scientific results**
  - Improve your presentation skills: give presentations to the group then progress to larger national meetings and then international conferences
  - Improve your writing skills by writing research papers and proposals
  - Discuss your results with others (students/PDRAs/staff) - explaining your work helps you better understand what you have done and why!
- **Understanding how your work fits into the bigger picture**. Follow the background scientific literature and recognise the strengths and weaknesses of your research (and the research of others)
  - Follow new research in your area by following, e.g., arXiv.org pre-print archive regularly (e.g., each day or week) and NASA ADS

Dividing your time between research and PG course

- Post-graduate course runs for two terms
- 25-50% of your time will be spent attending lectures and completing course work
  - Manage your time so you can make progress on your research

- Third term: complete your research report and pass your viva (by end of June) - often this is the first draft of your research paper

Your supervisors know that you attend the PG course and undertake the course work.

Building your research portfolio

- **Your success in research so often depends on your research portfolio**
  - Your scientific papers
  - Your reputation for giving good presentations
  - Your visibility within your research community
  - Talking to researchers from outside Durham (e.g. seminar speakers/visitors)

- **Directing your PhD research**
  - At first your supervisor will guide your research
  - Towards the end of PhD you should start to take control and design your own research experiments/projects

Outreach


Durham University
BUILD A GALAXY
UNIVERSE CREATOR
ICC
Durham University

Celebrate Science

- **Celebrate Science**
- Programme of events
- Activities at other University Attractions
- Map and directions
- Partners

Celebrate Science

Come along and help celebrate our 10th anniversary!

Tuesday 29th - Thursday 31st October 2019 10am - 4pm Daily

Celebrate Science will be back at the end of October 2019 with another 3 fun-packed and fascinating days of FREE children's events, activities, workshops and experiments

A host of Free events will be taking place across Durham University visitor attractions as part of the Celebrate Science 2019 Festival. From FREE children's craft activities to science and nature trails. Explore our other venues to see what else you can discover.