

# Institute of Astronomy “astro-jobs” presentation

- Paul Hewett and the IoA have run an annual interactive seminar, targeted at Ph.D. students about to enter their final year of study, for 38 years. The present two-part format has been in place for  $\sim 23$  years with the material originating from a collaboration between Paul Hewett (IoA), David Alexander (now U. Durham) and Stephen Smartt (now U. Oxford)
- There are many ways to generate excellent application materials and, as such, both presentations are designed to stimulate discussion/thought rather than to act simply as prescriptive instructions

# Astronomy Job Opportunities for New Ph.D. Graduates.

Paul Hewett

# Talk Overview

- Do you want a career in astronomy?
  - Advantages and disadvantages
- Available Options:
  - Post-doctoral fellowships (PDF)
  - Post-doctoral research assistants (PDRA)
  - Large Project and Observatory Support positions
- Timetable and Pay
- Will I get a position and a career?
- Brief mention of non-astronomy jobs

# Do You Want a Career in Astronomy?

- Disadvantages [some only possible] -
  - Will need to move around initially - probably two or three fixed-term contracts
  - No guarantee of permanent position – career change in your ~30s?
  - Academia not immune to public sector “accountability” requirements/constraints – e.g. current UK Government funding issues
  - Salaries lower than in private sector

# Do You Want a Career in Astronomy?

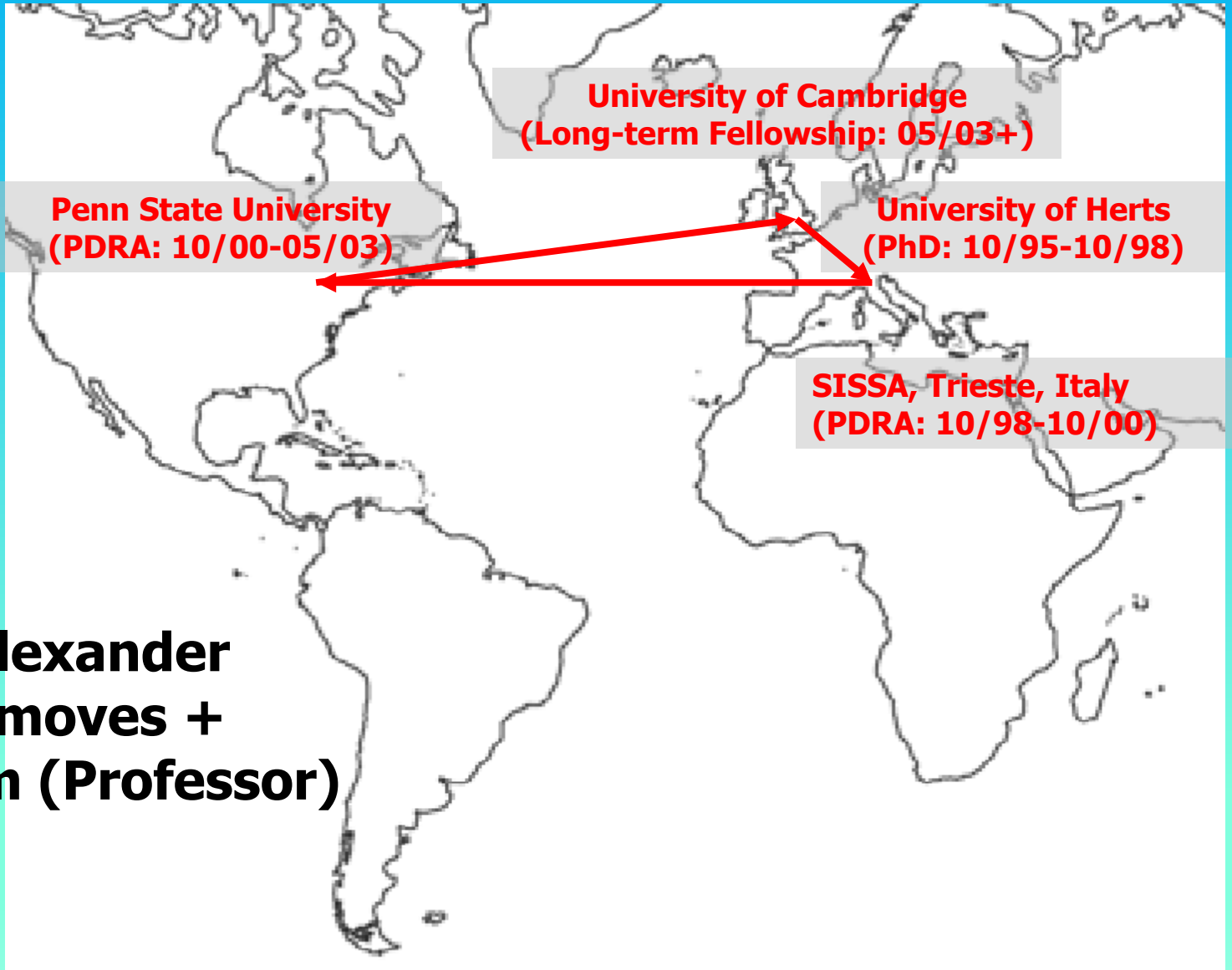
- Advantages -
  - Job satisfaction – it is what you want to do!
  - Opportunities to work and live abroad – **travel/observations/conferences**
  - Variety - supervisor, project leader, public speaker, software engineer, cutting-edge technology, [numerous] research problems,...
  - Creativity – can be in charge of your own direction
  - Flexible working hours
  - Job security in long-term/permanent position

# Do You Want a Career in Astronomy?

- Advantages (cont.)
  - Responsible/supportive Employers:
    - maternity/paternity leave
    - Part-time working opportunities
    - Pension provision
  - Responsible Funding Bodies (STFC, RS,...):
    - Recognise career-break implications
    - Provide specific opportunities for those returning from career breaks
    - [some] funding specifically targeted at individuals with family location/responsibility constraints

# Available Options – Three Types of Post-doc Job

- 1) Post-doctoral fellowships (PDF)
- 2) Post-doctoral research associates (PDRA)
- 3) Support and facility jobs
  - Software development for projects/surveys
  - Support scientists for telescopes
  - Instrument scientists
  - Usually 25-33% research allocation



**Dave Alexander  
career moves +  
Durham (Professor)**



# 1) Fellowships

- Huge amount of flexibility, allowing for maximum scientific creativity
- Possibly wider scientific recognition
- Manage own travel/equipment budgets
- But:
  - Competitive
  - Must be self motivated
  - You will be responsible for promoting your work
  - May not get [much] direct support from hosting department

# 1) Fellowships: some opportunities

- ESO fellowships (15/10/2024)
- Hubble fellowships (~6/11/2024) – includes Hubble, Chandra and Sagan positions
- University fellowships - mostly US but some UK (Oct-Dec 2024, see AAS Job Register)
- Royal Astro. Society PDFs (October 2024)
- All on AAS Job Register webpages
- Cambridge+Oxford Research Fellowships

## 2) PDRAs (postdoctoral research associates)

- Virtually all post-doc jobs in UK, apart from fellowships, are “PDRAs”
- Must work with employer on project – but wide variation in requirements/options
- Advantages – supervisor motivation, data already, well defined, group exists  $\equiv$  papers
- Gives opportunity to change research direction
- Advertised on American Astronomical Society (AAS) and home institution websites

# 3) Support/Project Positions

- ESO jobs in Garching and Chile
- “project” or “survey” software options
  - Both satellite (Euclid) and ground-based (DESI)
- Observatory Positions, including ING (La Palma), AAO (Australia), Gemini, Keck,...
  - Research restricted, but wide experience
  - Project management and delivery
  - Relatively well paid, can be tax free, allowances
  - Short term can benefit your research career
  - Longer term  $\Rightarrow$  instrumentation development

# Teaching Possibilities

- In 2011 - I was asked about “teaching”
- Cambridge/Oxford undergraduate supervision system is essentially unique
- Most universities have some opportunities for teaching (example classes, labs,...)
- Employers generally reluctant to allow any significant commitment (impacts on research!)
- Lecturing, even supervising, postgrad students can be a possibility
- Career option would be US liberal arts college – with focus on undergraduate physics/research
- Now some teaching positions at UK universities – a growth area

# Application Timetable

- The vast majority of positions are driven by the annual AAS 15 February decision day
  - Application deadlines October-December
  - Decisions/offers January
  - All sorted on, or just before, 15 February!
- Many individual exceptions: including EU fellowships, some UK and ERC PDRAs, observatory positions,...
- UK STFC PDRA funding confirmed only in December – different timings
- The AAS Job Register Site is your first/main port of call: <http://jobregister.aas.org/>

# Other Fellowship Opportunities

- Essentially by definition any PDRA or observatory/facility/project opportunity is “astronomy” and the AAS Job Register is the source
- There are some, although not many, more general fellowship opportunities:
  - Marie Curie early-career fellowships (Europe)
  - 1851 Fellowships (UK)
  - Leverhulme Trust Early Career Fellowships (UK)
  - Cambridge and Oxford College fellowships
  - A number of individual university fellowships but always included as opportunities on the relevant department website

# Pay!

- University: PDRA – Lecturer – Senior Lecturer – Reader – Professor (now assistant-, associate- and full-professor)
- Approx Cambridge minimum pay (now): £37k - £48k - £63k - £69k - £81k+
- USA salaries somewhat [some much] higher
- Certain European EU-salaries considerably higher (specially for postdocs)
- Location/circumstances major factors in lifestyle decisions given modest salaries



# Will I get a job?

[To start: Orientation comment on who you are]

- RAS studies (1993-1998 & 2011) in the UK:
  - ratio of new University positions to PhDs = 15%
- ~50% of new PhDs choose to leave astronomy
- Thus, about 30% chance of getting a lectureship (in the UK) but movement in/out of UK changes stats
- **Statistics not very relevant to IoA/Cambridge**
  - ~20-25% of IoA PhDs decide to leave astronomy
  - Close to all those who wish to continue do continue and the vast majority obtain permanent positions
  - Some small differences between UK/non-UK students
- A postdoc “to see” not a disadvantage for employment

# UK Statistics

- About 600 academic positions in universities and around 100 technical positions (includes STFC-funded institutions)
- Approximately 250 Ph.D. students per year
- Academics pretty stable souls, say hold position for 30 years, then #positions per year  $\sim 20$
- Overall statistics not encouraging

# UK Statistics

- Lots of additional factors/caveats but it is true that about half of STFC Ph.D. students have no interest in a career in academia
- Steady-state situation (hasn't been true) still only one in six chance for a Ph.D. student in the UK
- True on average **but** as Ph.D. students at the IoA [DAMTP/Physics] you are not fair test particles

# IoA Statistics

- In a Ph.D. programme with
  - Competition for Ph.D. place very significant
  - Highest completion rate in the UK
  - Fastest completion rate in the UK
  - Very high quality of publications
- Looking back over 38+ years
  - ~25% of IoA students decide to target non-academic jobs
  - Three out of four students go on to academic careers

# IoA Statistics

- Year to year variations are significant
- Cohort coherence effects do exist
- Possible long-term change as assessment of work-life balance issues alter plus growth in data-science opportunities
- Cannot remember a student with a realistic (geography, number of applications) who could not obtain a good postdoc position
- Not automatic - you do have to work!

# IoA Statistics

- Example for high-profile fellowships
- USA top “Fellowship” schemes
  - Hubble Fellowships ( $\sim 12$  per year)
  - Einstein Fellowships ( $\sim 6$  per year)
  - Sagan Fellowships ( $\sim 6$  per year)
- A recent five years - 2012-2016
  - IoA Ph.D. students were awarded 9 fellowships
- Not many applications but success rate exceeds 1 per year [our  $\sim 12$  students of the world!]

# Recent uncertainties

- UK left the European Union
  - Finally back in Horizon Europe – good 😊
  - Engagement via ESO, ESA and many collaborations unaffected
  - Royal Society also unaffected
- Covid-19 and post-Covid impact
  - There was a negative impact on faculty opportunities for a few years
  - Fellowships/PDRAs weren't affected
  - Talks/interviews/meetings – remote now & significant positives as a result

# Non Astronomy Jobs?

- Transferable skills
  - Problem solving
  - Creative thinking
  - Self motivating and managing
  - Analytic/computing/numerical experience/skills
- University Careers Service/School of Physical Science can provide:
  - Introductory interviews
  - Direction/ideas
  - Suggestions for CVs etc [excellent CV guide]
- Contacts with past PhD students
- PhD astrophysicists are **very** employable
- An “interesting” contrast in terms of salaries and working environment/support compared to academia