

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 37 years. The present two-part format has been in place for ~ 22 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 - you want to do it!
 - 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

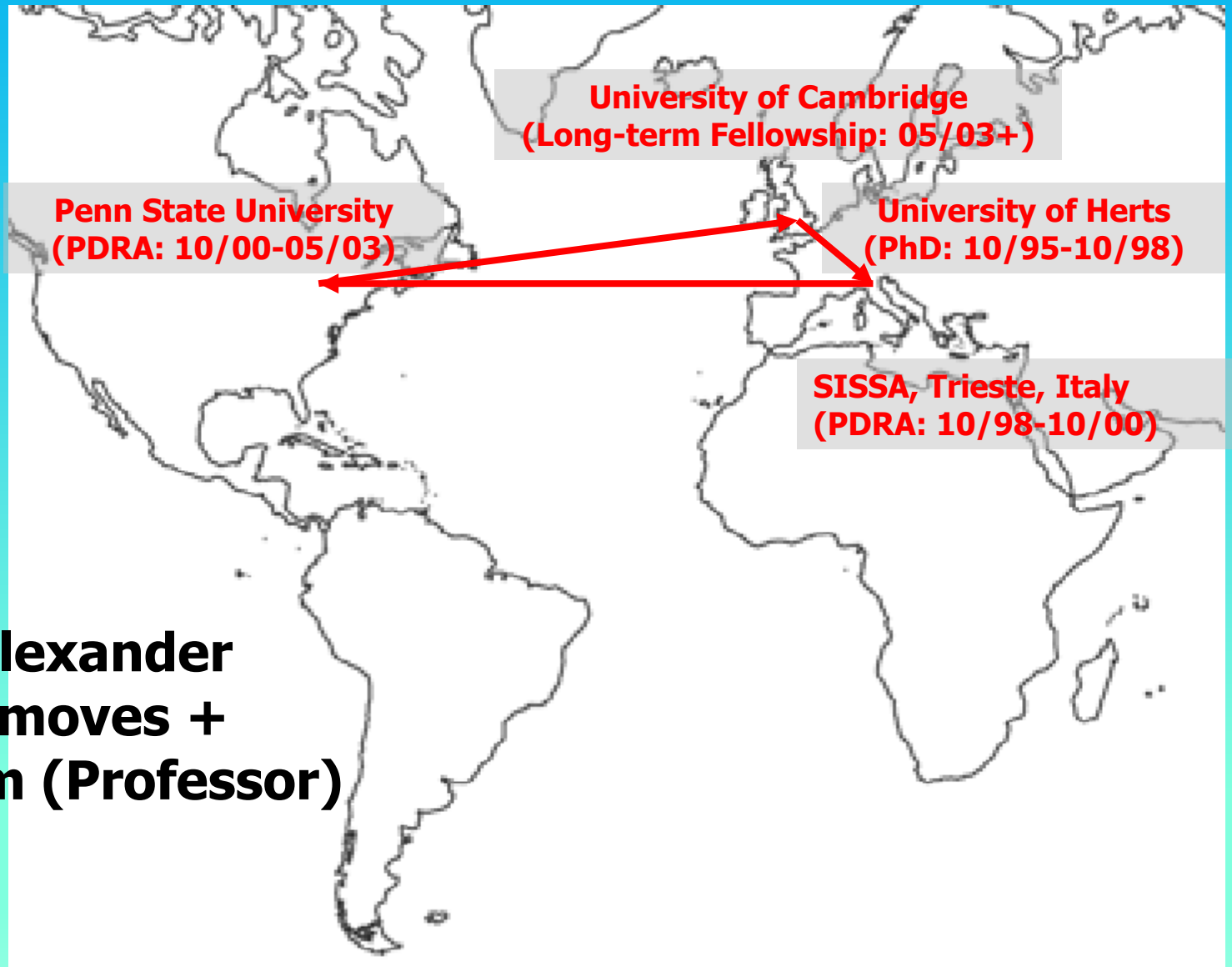
Do You Want a Career in Astronomy?

- 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 (15/10/2023)
- Hubble fellowships (~6/11/2023) – includes Hubble, Chandra and Sagan positions
- University fellowships - mostly US but some UK (Oct-Dec 2023, see AAS Job Register)
- Royal Astro. Society PDFs (October 2023)
- All on AAS Job Register webpages
- Cambridge+Oxford Research Fellowships

2) PDRAs

- 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

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, 16 February!
- Many individual exceptions: including EU fellowships, some UK and ERC PDRAs, observatory positions,...
- UK PDRA funding confirmed only December
- 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
- Approx Cambridge minimum pay (now): £36k - £47k - £61k - £67k - £78k+
- USA salaries somewhat [some much] higher
- Certain European EU-salaries considerably higher (for postdocs)
- Location/circumstances major factors in lifestyle decisions given modest salaries

Will I get a job?

- 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 ~ 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 37+ 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 (~ 13 per year)
 - Einstein Fellowships (~ 9 per year)
 - Sagan Fellowships (~ 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 ~ 12 students cf the world!]

Current uncertainties

- UK left the European Union
 - Future involvement with Horizon Europe uncertain [August 2023] – not 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