Applying for post-doc jobs in astronomy*

(2019 edition)

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*A short, biased guide, based on both data and personal experience.

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Outline

- Pros & cons of a career in astronomy / academia
- Post-doc jobs
  - Fellowships, PDRAs, etc.
- Logistics - the "job market"
  - How to find jobs
  - Timetables
- How to apply
  - The application process
  - Writing a good job application
- General advice / final thoughts

https://www.astro.le.ac.uk/~rda5/jobs_2018.html

My career

Cambridge (PhD, '02-'05) ⟫➡ Colorado (PDRA, '05-'07)

⟫➡ Leiden (PDRA, '07-'09) ⟫➡ Leicester (faculty)

Astronomy careers

Do you want a career in astronomy?

- **Pros:**
  - Job satisfaction.
  - Opportunities to travel or move abroad.
  - Flexible working arrangements and conditions.
  - Job security (in the long term - permanent positions).

- **Cons:**
  - Short-term instability. Post-doc positions are typically 2-3 years, and usually require you to move (often internationally).
  - Slow and messy career structure, with poor job security at earlier stages. Major career "bottleneck" is often in mid-30s.
  - Astronomy is largely reliant on state funding (more so than other sciences), so budgets vary due to politics/economy.
  - Salaries generally somewhat lower than in private sector.

Career statistics

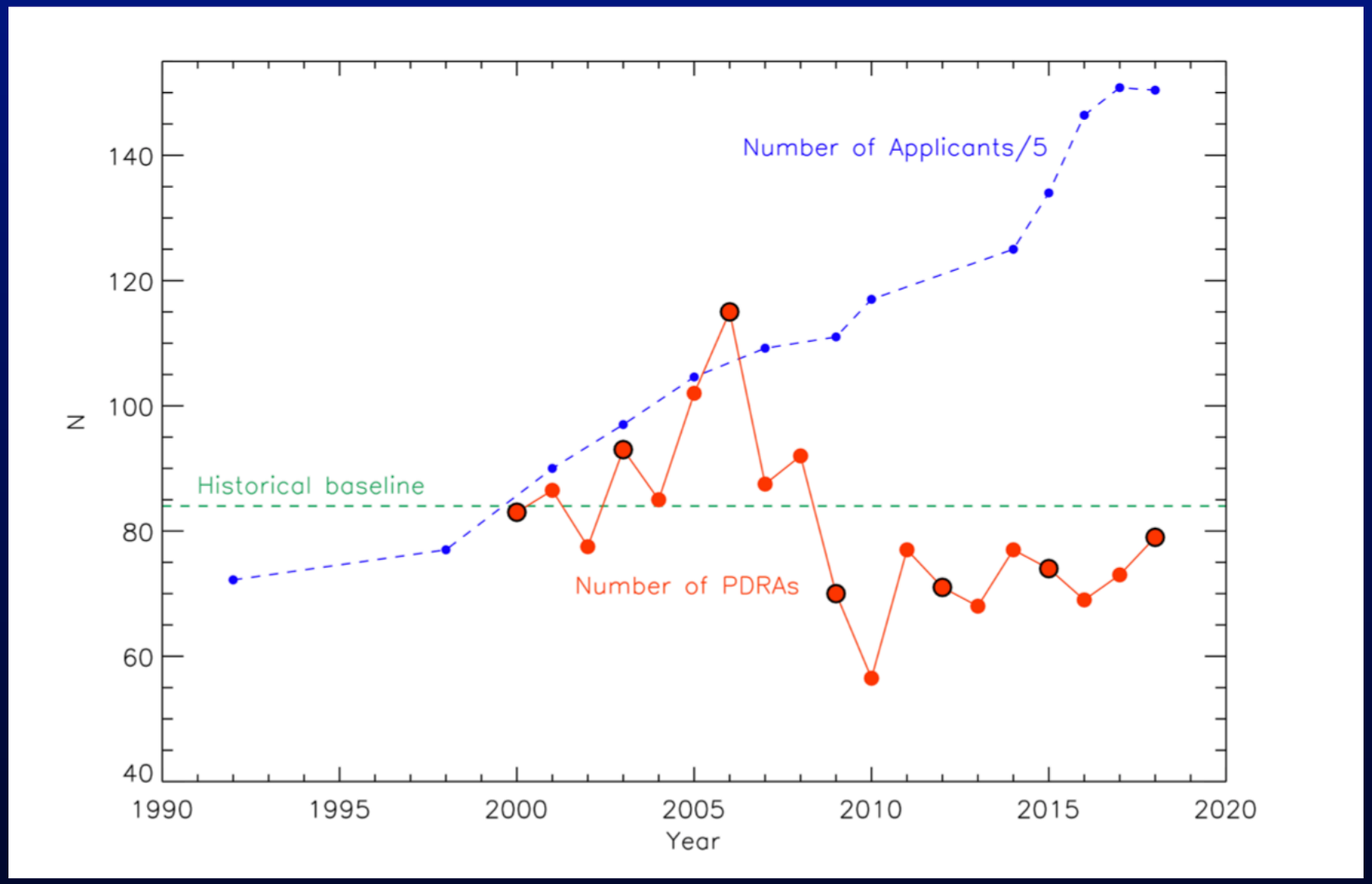
- In the UK, ~50% of astro/space-science PhD students go on to post-doc jobs (~1/2 in the UK, ~1/2 abroad)*.
- Similar numbers for Leicester students, albeit with small number statistics.
- UK career "flux" numbers (positions/year)*:
  - PhD students ~120
  - Post-docs ~60
  - Academic staff ~5-10
- 5-10% of UK students end up in UK academic jobs, plus 5-10% in other astro jobs (non-academic/abroad)*. [But note these stats have long (~10yr) "lead time".]

*Sources: RAS Demographic Survey (2011); RAS Report on Astronomy Careers (2005); STFC stats.

Career statistics

- Job market has changed greatly in last ~10-15 years:
  - substantial increase in worldwide student and postdoc numbers (post-docs peaked ~2010; students still increasing).
  - no corresponding increase in the number of permanent (faculty) positions.
- Result is a dramatic change in career timescales: longer post-doc periods (on fixed-term contracts), and greatly increased competition for permanent positions.
- 2010 US Astronomy Decadal Survey found that the "standard" time spent as a post-doc increased from 3-4 years in late '90s to 6-8 years in late '00s.
- Note: demographic surveys have ~decade "lead time".

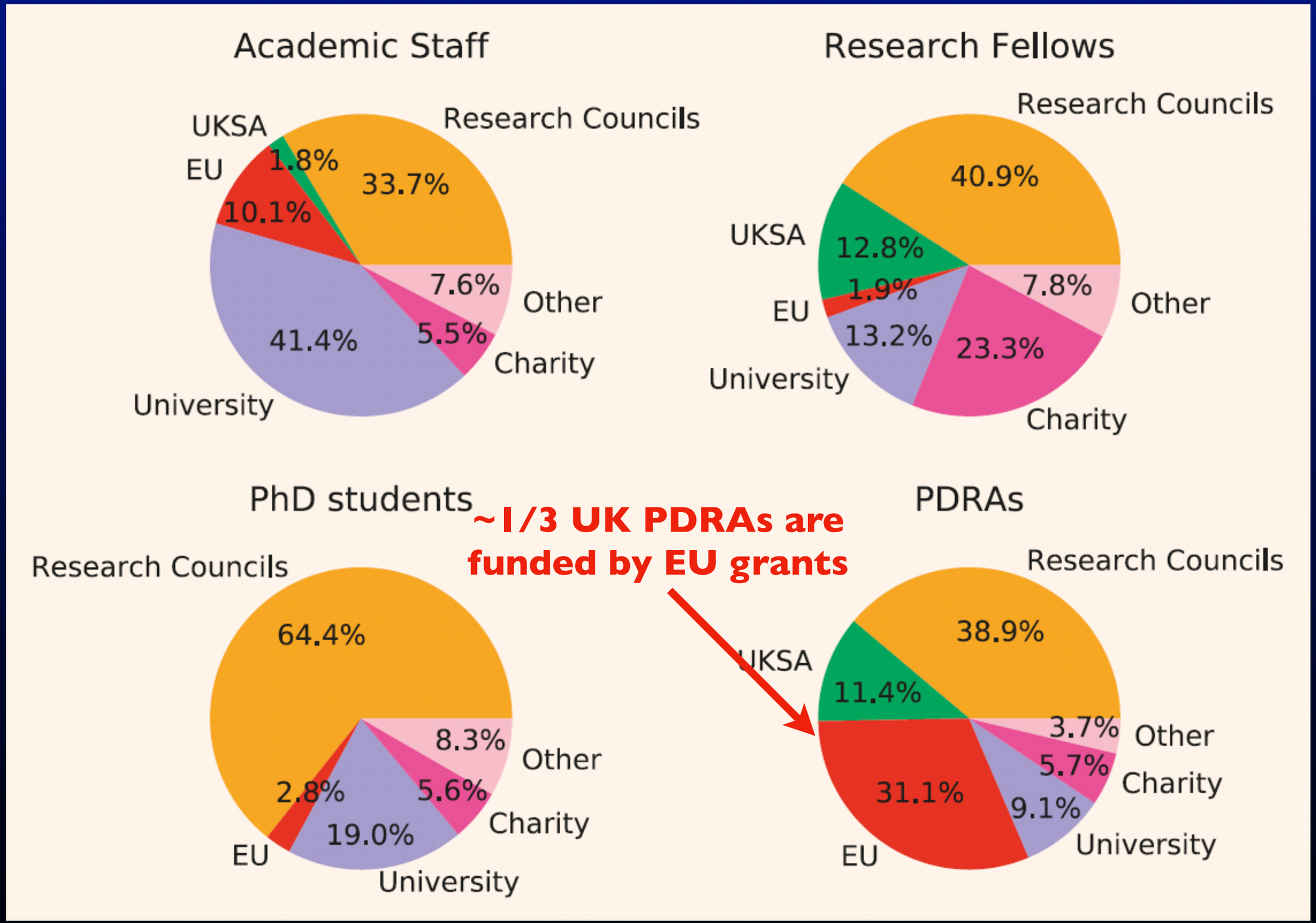
STFC-funded post-doc positions



2018 STFC AGP community report

- EU funding (primarily ERC) has mostly offset the decline in STFC post-doc numbers in the last decade.

UK Astronomy Funding Sources



2019 STFC Astronomy Advisory Panel report

- UK universities have standard pay-scale (age/experience). Current starting salaries for post-docs ~£30-35k.
- US/Canadian salaries tend to be somewhat higher, ~$50-70k. (Always ask about benefits in the US.)
- EU salaries vary substantially: often €40k+ in Netherlands & Germany; can be €25k (or less) in other countries.
- Some jobs (notably ESO & ESA) offer tax-free salaries.
- Other money factors: research budget, moving expenses, benefits (health insurance, childcare, etc.), tax rates.
- For most people, salary differences are not usually a major factor in deciding between post-doc jobs.

Post-doc jobs

Types of post-doctoral jobs

- **Fellowships (to take to institute of choice)**
  - e.g., Hubble, Einstein, ESA, RAS, etc.
- **Institutional/departmental fellowships**
  - e.g., CfA Clay, Berkeley Miller, CITA, Leiden, etc.
- **Research associates (PDRAs)**
  - most post-doc jobs fall into this category; huge variety.
- **Technical/support positions**
  - usually some time allocated for research.
- **Temp lectureships, teaching fellowships, etc.**
  - fixed-term teaching posts, usually with some time for research.

Fellowships

- Fellowships carry two major advantages:
  - academic freedom (you work on what you want to).
  - financial independence (you control your own research budget).
  - [may also carry more prestige/recognition]
- Also some disadvantages:
  - competitive.
  - require self-motivation (no supervisor to tell you what to do).
  - may not always be well-supported by host department.
- "Open" fellowship applications (e.g., Hubble, RAS, ESA) require endorsement of host institution.
  - must contact departments well (weeks) before deadlines.
  - suitability of host department often an important factor.

Named Fellowships (examples)

- **Hubble**. Any US institute; (almost) any field. **4 November**
- **ESO**. Garching or Chile; 25% service. **15 October**
- **NWO Veni**. Any Dutch institute, all science. **?? January**
- **Humboldt**. Any German institute, all science. **(no deadline)**

- **"1851"**. Any UK institute, all science. **6 February**
- **RAS.** Any UK institute (with no current fellow). **18 October**
- **Winton.** Any UK institute, exoplanets. **???**
- **etc., etc., ...**

Institute Fellowships (examples)

- **Cambridge: Kavli** — **21 October**
- **CfA: Clay/Post-doc** — **30 October**
- **Princeton IAS Fellows** — **15 November**
- **Caltech Burke Fellowships** — **15 November**
- **CITA Fellowships** — **11 November**
- **Bern CSH Fellowship** — **31 October**
- **etc., etc., ...**

Research Associate Positions

- "PDRA" = any job funded through someone else's grant.
- PDRAs account for the vast majority of post-doc positions.
- Employed to work on specific project(s), but huge variety:
  - some PDRAs offer near-complete freedom in research.
  - others are highly targeted and/or project-specific.
- Pros:
  - motivation provided by supervisor.
  - projects already exist - can lead to many papers (quickly).
  - opportunity to branch out from PhD project (with expert supervision).
- Cons:
  - can be harder to establish independence.
  - may be less scope/time for working on your own ideas.

Technical/support positions

- Usually linked to facilities:
  - ESO (Garching & Chile), UKATC, ESA, etc.
  - telescopes (Hawaii, La Palma, XMM, Swift, etc.).
  - computing (data centres, super-computers, group positions, etc.).
- Pros:
  - gain experience (both technical and management).
  - can benefit research career in short-term.
  - in longer term can lead to "new" career (e.g., in instrumentation).
  - "lifestyle factors" (often generous tax breaks, allowances, etc.).
- Cons:
  - limited time for research.
  - can limit future options (in some cases).

The astronomy job market

When to apply

- This is the start of "job season" for astronomy post-docs.
- AAS enforces a decision deadline of **15th February.**
  - no US institution can ask post-docs for decisions before 15th Feb.
  - not enforced elsewhere, but many non-US institutes operate to roughly the same timetable.
  - result is that majority of astro post-doc jobs have deadlines Oct-Jan.

- For jobs starting in autumn 2020, **apply now!**
  - if you wait until after Christmas, you will miss out on many options.
  - still allows you to apply for "out-of-season" jobs if necessary.
- Major resources for job ads:
  - AAS Job Register (1st of each month) - `jobregister.aas.org`
  - RAS Jobs mailing list (email subscription)
  - Rumour mill (hosted by `astrobetter.com`)

What to apply for

- Best to apply for a range of jobs - fellowships & PDRAs.
- Don't rule things out too quickly - a change can be good. (Also, when the alternative is no job at all...)
- However, don't apply for jobs that you really don't want.
- Ask your supervisor (and other people) for advice.
- You won't get any job you don't apply for....
- ...but be realistic.

- Be aware that many people apply for *lots* of jobs: 30+ applications is not unusual. (I did ~20 each time.)

In the UK...

- Few UK post-doc fellowships, which means limited options for independent early-career researchers.
- No STFC scheme, but other options do exist:
  - "1851" fellowships.
  - RAS fellowships (must have finished PhD before applying).
  - Winton exoplanet fellowship.
  - Cambridge/Oxford college fellowships ("JRFs").
  - some named university fellowships (usually open to all science).
- ~1/3 of UK astro PDRA posts are currently funded by the EU (mostly ERC). Not clear what will happen post-Brexit.
- Expect a few tens of PDRA positions to be available:
  - Currently only ~5 UK PDRAs on AAS Job Register, but most UK jobs not advertised until after STFC grants announced (in Oct/Nov).

In the UK

Brexit???

- Few UK post-doc fellow… …ited options for independent ea…
- No STFC s…
  - "18…
  - …
  - s… …ence).
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Brexit???

Writing job applications

Applications typically require:

- [Covering letter/email]
- **CV**
- **List of publications**
- **Research summary**
- **Research proposal**
- **Reference letters**

Statement of research interests

- [Statements on outreach, impact, teaching, etc.]
- Talks / Interviews (if short-listed)

Covering letter/email

- Say:
  - who you are (include contact details).
  - what job you are applying for (with reference number).
  - your background/interests, why you are applying.
  - names and contact details of referees (including email).
- Be brief and to the point.
- First impressions can be important!

CV

- Include:
  - Name & contact details (also citizenship)
  - Academic record from first degree onwards ("PhD expected...")
  - Research experience / skills
  - Research awards / grants / prizes
  - Invited talks (departments & conferences)
  - Teaching experience
  - Outreach / public understanding work
  - (Career breaks)
  - (Languages)
- Omit:
  - Pre-university academic record
  - Details of jobs outside the field (unless relevant), external interests.
  - Any long chunks of text!
- Should be no more than 2 pages.

List of publications

- Separate refereed & non-refereed.
- Reverse chronological order is standard (most recent first).
- For each paper give title, authors and reference.
- Include “in press” and “submitted” papers.
- “in prep” is a maybe (1-2 can be useful; lots is bad).
- Can include conference talks & posters.

- May wish to highlight your name in (long) author lists.
- Providing web links to papers is a good idea.
  [Links to ADS/arXiv publications lists will be greatly appreciated by potential employers!]

Letters of reference

- Usually 2-3 required (often can't all be from same institution).
- Who to choose?
  - your supervisor
  - other collaborators
  - people who know your work well
  - head of group/dept. or other "VIP"
- Discuss this with your supervisor (and the referees). Best choice of referees may not be the same for all jobs.
- Ask referees in plenty of time (i.e., weeks, not days).
- Provide them with information: where to send letter, job details (link to advert), copies of your application materials.

Research statement / proposal

- Usually one document - “statement of research interests”. Sometimes split into two - summary + proposal (fellowships).
- Typically 3 pages, sometimes shorter.
- Should be accessible to a non-specialist.
- Important, especially if you haven’t published much yet.
- Tips
  - include figures
  - remember your audience
  - balance of details and big picture
  - follow the rules: fonts, margins, etc.
  - (Letter-size paper, not A4, for US jobs.)

Talks / Interviews

- Panel interviews required for some fellowships.
  - Format is typically short (~10 min) presentation followed by questions.
  - Panels are broad. May not be anyone from your field on the panel.
  - Questions can be quite wide-ranging (ask previous candidates for tips!).
- Less formal interviews more common for PDRAs (often by phone/Skype, especially for international jobs).
  - Again, wide variety of formats depending on person/group/department.
  - Two-way process. Do you want to work for/with this person/group?
- Also common to visit the department and give a talk.
- A little planning can go a long way.
  - Surprising how many candidates haven't thought about answers to obvious/basic questions (like "Why do you want this job?").

On proposal writing...

- Proposals are difficult to write well, especially the first time. (Ask friends/colleagues for good/successful examples.)
- Job/grant proposals are ***not*** papers. In many ways a proposal is closer to a sales pitch than an academic article.
- You're writing about ***YOU***; the science is a "sub-plot".
- Tailor it to your audience: a proposal for a non-specialist panel should be very different from a targeted PDRA application. (In particular, beware of field-specific jargon!)
- Ask for criticism (the more, and more diverse, the better).
- Always remember that employers will read tens/hundreds of these. Important to capture interest, stand out from crowd. Make them want to hire ***you***.

On proposal writing...

- Proposal writing is a skill in itself.
- Can seem like a chore, but is also an opportunity: chance to take stock, assess where your research is going, and to think of new ideas.
- You should aim for your proposal to be "compelling". You want the panel to feel bad if they don't give you the job.
- Need to make a case for both you and the science. ("X is the most interesting project, and I am the best person to do it.")
- For fellowships, important to convince panel that you will get results in 2/3/5 years. Project time-line is a useful "trick".
- Expect to re-write and polish proposals *many* times.

Raising your profile

- Be seen!
  - Try to go to conferences in the run-up to job season.
  - Ask about giving talks in other departments. (They might even pay.)
  - Talk with *everyone* (visiting speakers, conferences, etc.). It never hurts to have people remember you and/or your work.
  - If applying to the US, consider the January AAS meeting (or DPS).
- Get your work noticed:
  - Conferences, seminars; also talks by your supervisor.
  - Try to get papers out (at least on arXiv) before job deadlines.
- **Set up a website** (potential employers ***will*** Google you):
  - Single source for info is good. But a bad website worse than none at all.
  - [see Matt Kenworthy's advice on setting up a professional web-page.]
- Always think of the big picture - why is your work important?

Final thoughts

- Job applications can be daunting, but they don't have to be.
- Applying for post-doc jobs can be **very** time consuming.
  - start soon, expect to spend weeks on applications.
- In general, if you want a career in physics/astronomy then variety is a positive factor:
  - important to demonstrate independence (especially from supervisor).
  - a broad range of interests is usually important in the long-term.
  - having worked abroad sometimes viewed as a positive.
- Try not to take the process too personally.
  - job market is somewhat stochastic, especially early in careers. Also, *everyone* gets rejected at some point (usually many times).

Acknowledgements

- This talk stems from a similar talk given when I was a student (by Steve Smartt in 2004, and then Dave Alexander in 2005).
- I've also collected info & opinions from several similar sets of slides on the web (in particular by Paul Hewett, Sera Markoff, Hiranya Peiris & Matt Kenworthy).
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