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Title: Academic ecosystems must evolve to support a sustainable postdoc workforce

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Abstract: The postdoctoral workforce comprises a growing proportion of the STEM community and plays a vital role in advancing science. Postdoc professional development, however, remains rooted in outdated realities. We propose enhancements to postdoc-centred policies and practices to better align this career stage with contemporary job markets and work life. By facilitating productivity, wellness, and career advancement, the proposed changes will benefit all stakeholders in postdoc success - including research teams, institutions, professional societies, and the scientific community as a whole. To catalyse reform, we outline recommendations for a) skills-based training tailored to the current career landscape, and b) supportive policies and tools outlined in postdoc handbooks. We also invite the ecology and evolution community to lead further progressive reform.

Main Text (current word count 2188):

Postdoctoral researchers (“postdocs”; Fig. 1A) contribute extensive research, teaching, and service to their supervising faculty, home institutions, and broader scientific communities^{1–4}. In principle, these contributions are rewarded with opportunities to specialize and develop independence. In practice, however, postdocs’ progress and well-being are constrained by social, mental, and financial challenges^{1,5–7}. Further, the skills and credentials that are prioritized in postdoc positions are misaligned with contemporary job markets (e.g. ^{8–11}, Figure 1C). These issues highlight an urgent need for policies and practices that better support a growing postdoctoral workforce. Ultimately, this will benefit all stakeholders in postdoc success -- providing ethical and far-reaching returns on time and resource investments ^{1–5,12}.

Below, we describe five goals for enhancing postdoc professional development. We also highlight innovative examples of policies and practices from around the globe. Our recommendations are applicable to many STEM disciplines, but especially relevant to ecology and evolution. Alternative careers in these fields commonly require additional training^{13–15}, and non-academic paths are often unknown to both postdocs and their mentors. This causes anxiety and reticence for postdocs who, by choice or by necessity, are considering non-traditional careers^{1,16,17}. Fortunately, the ecology and evolution community is also poised to lead adaptive reform. Our research targets complex interactions spanning many levels of biological organization. Consequently, our community possesses the tools and perspectives needed for strategic, evidence-based engineering of workplace ecosystems⁹.

Goal 1: Align career development with job markets

Research-focused postdoc positions were conceived as stepping-stones to faculty jobs, and postdoc professional development remains narrowly focused on the corresponding credentials and skills^{18,19}. Job markets, in contrast, have changed. While most postdocs still desire faculty positions¹⁷, they increasingly disperse into a wide variety of careers in government, non-profit, and private sectors (Fig. 1A, B). This changing landscape, seen in both the United States²⁰ and Europe^{21–23}, is especially evident within ecology, where 73% of US PhD recipients did not become research faculty over a ten-year period¹⁴.

How can STEM postdocs better prepare for diverse job markets? One approach involves provisioning skills-based training, such as workshops on teaching, project management, or communication^{24,25}. These can complement traditional academic training to prepare postdocs for diverse careers (Fig. 1C), but must be carefully integrated with other workplace aims and expectations^{11,15,18,26,27}. While many universities now offer “alternative” career development activities, these resources fall short if poorly advertised, infrequently offered, or systematically deprioritized.

One innovative career development tool is the UK’s Researcher Development Concordat^{28,29}, a dynamic agreement between funding agencies and research institutions - including many of the UK’s top-ranked universities. The Concordat outlines protections for researcher career development that were developed by representatives from all levels of the hierarchy, including a minimum of 10 days annually for employees to pursue professional development.

Goal 2: Sustain wellness and work-life balance

Mental health is linked to physical health and is foundational to motivation and productivity^{30,31}. Among graduate students, low morale and depression are often attributed to financial insecurity, social isolation, and lack of sufficient mentorship^{32,33}, and these factors can also impact postdocs²⁹. For example, postdocs face high risks of social isolation due to short-term contracts, staggered arrivals, and frequent relocations^{1,5,27,34}. Importantly, social isolation can be amplified for underrepresented minorities, LGBTQ+ individuals, foreign researchers and other marginalized groups^{32,35}. Burnout, a related concern, is more likely when professional development and job searching are crammed into evenings and weekends. We recommend that individuals and institutions work to cultivate thriving peer communities, implement evidence-based initiatives supporting diversity, equity, and inclusion, and provide strategic tools (e.g. healthcare programs) that offset mental, logistical, and financial strain. Supervisors can further promote wellness by clarifying expectations and values, modelling healthy work habits, discussing wellness in research planning and performance evaluation, and celebrating

diverse axes of achievement^{1,5,36}. Importantly, these mentoring efforts must be rewarded to flourish (see Goal 3).

Financial solvency, another dimension of work-life balance, is an important consideration in seeking postdoctoral work. The economic impact of a postdoc is difficult to assess given the job's uncertain duration and outcome, variation in costs of living, and a common requirement of self-financed serial relocation^{8,27}. Postdoc salaries vary greatly among nations, both relative to national medians and compared to those of non-postdoc residents with comparable credentials (Supplementary Table 1). For example, current postdoc stipends funded by the US National Institutes of Health (NIH) start at 44.6k€ (50k US\$) per year, falling short of the National Academy of Sciences' minimum recommendations from 2014 (an inflation-adjusted minimum of 48.6k€/year)⁸. Indeed, while typical postdoc salaries correspond to 1-1.5x the median salary in most countries surveyed, 36-60% of individuals with similar educational backgrounds outearn postdocs in these countries (Supplementary Figure 1, Supplementary Table 1). Many postdocs will also fail to recuperate delayed earnings. In France, for example, the salaries of postdocs transitioning into the private sector are not influenced by postdoctoral experience³⁷. These findings are particularly bleak given that most STEM postdocs have already deferred saving through several years of graduate training.

Disparities in other job benefits are also common among institutions, countries, and funding sources. For example, less than 35% of US institutions offer (e.g. parental) leave benefits for postdocs¹². Within institutions, individuals supported by external fellowships can also be denied benefits afforded to local colleagues, such as health insurance and retirement plans. In summary, to maintain the attractiveness of the postdoc career path to diverse and high-performing researchers, we must correct the insufficiency and inequity of current compensation standards.

Goal 3: Enhance mentoring

Postdoctoral work represents a challenging metamorphosis from apprenticeship to independence, providing advisors the opportunity to play positive, formative roles. Because postdoc roles vary greatly across institutions, here we define "advisors" in a very broad sense - including all senior colleagues who are tasked with, or benefit from, the oversight of postdoc progress. Unfortunately, most advisors receive little or no mentorship training, and mentoring excellence is poorly rewarded in academia³⁶. Consequently, advisors often deploy *ad hoc* mentoring that can cause personal and professional harm to mentees. This also harms group leaders and academic programs by reducing retention and productivity (e.g. publication rate,

1,3,38,39). More effective mentorship can be facilitated through training,³⁶ and should be incentivized during hiring, evaluation, and merit-based promotion⁴⁰.

Great mentors provide postdocs with a running start followed by light-touch guidance, helping them identify misalignments between existing credentials, skill sets, and career goals, while recommending corrective steps. For research or teaching faculty, some of this work can be informed by personal experience. However, since most postdocs ultimately settle into different careers from their mentors (Fig. 1B), advisors should also encourage connections with colleagues, resources, or training that bridge gaps in experiential knowledge⁵.

Well-structured communication is an essential component of mentoring dynamics. To facilitate this, postdocs and advisors should meet within the first three months of an appointment to discuss goals and expectations, produce a formal mentoring agreement, and generate individual development plans³⁶. Other meeting outcomes might include written research plans, which can increase grant proposals and manuscript submissions by 25%³. Advisors should continue regular one-on-one meetings to revisit established goals and expectations, examining progress and setbacks through constructive bidirectional performance review. These procedures are standard practice in the private sector but remain rare within STEM institutions.

Lastly, postdocs can benefit profoundly from becoming mentors themselves³⁶. Fulfilling in its own right, mentoring others helps individuals better manage relationships with advisors, ultimately benefitting all members of a research team¹². Because authentic mentoring requires significant time and reflection, it should also be explicitly factored into a postdoc's career development plan and performance assessments.

Goal 4: Develop administrative support

Postdocs with administrative support are better positioned to stay motivated and productive, boosting the prestige of their group and institution^{1–3,16,39}. This support can also remove long-standing barriers to faculty positions for underrepresented groups in STEM^{8,35,41}. Administrative support can take several forms including international offices supporting foreign postdocs, and Offices for Postdoctoral Affairs (OPA) that provide advocacy and coordinate resources across entities^{1,12}. Self-organized Postdoctoral Associations (PDA) are another valuable resource that promotes interdisciplinarity, peer networking, and postdoc-centred advocacy^{12,42} (Table 1, Supplementary Table 2).

Currently, administrative support for postdocs varies widely among institutions. To demonstrate this, we surveyed 50 top-ranked universities' websites for any mention of an OPA, PDA, or other (e.g. department-specific) postdoc resource (for methods and full results, see Supplementary 2). A majority of the websites outlined at least one resource -- either at the departmental level (typically within a STEM discipline), or else within the graduate school. However, only 35% indicated a dedicated OPA or PDA at the university level); this included 58% of surveyed US institutions, whereas only 16% of surveyed European institutions mentioned an OPA and 32% mentioned a university-wide PDA. Transnational dialogues, ideally including policymakers, institutional administrators, and postdocs, could illuminate how this structural variation impacts various indices of success.

Local (e.g. departmental) initiatives can play key roles in recruiting and empowering postdocs. For example, institutional support was found to enhance job seeking strategies and efficacy among biomedical postdocs¹⁶. One mechanism for increasing local support involves granting postdocs representation in organizational decisions (e.g. faculty meetings). Small resource investments (such as access to a physical meeting space for video conferencing/interviews and interaction with students and colleagues) can further promote dynamic local peer communities, collaboration, and career development.

Data on postdoc career trajectories is valuable to many groups including jobseekers, funding agencies, and policymakers, yet is rarely gathered and shared by research institutions⁴³. Public disclosure of this readily obtained information (e.g. alumni research activities, service outputs, and job placements at the lab, department, and/or college levels) could significantly aid the development of best practices for postdoc training (Table 1).

Recent syntheses offer further recommendations for administrative change, (e.g.^{1,8,12,43}). At best, however, these carefully prepared guidelines are implemented sporadically among institutions. Our chief recommendation is therefore to explicitly include postdoc-related concerns in administrative mission statements, strategic plans, and other official policies at departmental and institutional levels (Table 1). This will ensure postdocs have a protected place and voice within local workplaces.

Goal 5: Increase broader support

Scientific societies and funding agencies already play vital roles in postdoc career development. For example, conferences help disseminate research and build networks that can lead to permanent jobs. Although many societies work to cultivate student participation,

postdoc inclusion initiatives are much less common. To illustrate this, we surveyed costs and supporting resources for 34 conferences in ecology and evolutionary biology that occurred between 2018 and 2020 (Supplementary Table 3). All events offered student rates (an average 44% reduction from full rate), but only 17 provided discounts for postdocs (at a smaller 13% reduction). For context, full professor salaries are often nearly double those of postdocs^{12,44}, making postdocs' income-adjusted conference costs disproportionately high. Conference costs are also amplified for individuals with special needs and/or more limited resources (e.g. scientists in developing countries and parents needing childcare); this can restrict career progression^{1,15,34,45}. Although some conferences offer support to broaden participation, only 40% of those we surveyed advertised such opportunities for postdocs. At a minimum, reduced postdoc registration fees would increase equity and invigorate scientific discourse at conferences. An even better approach might use sliding scales (e.g. based on self-reported income brackets) to determine registration costs.

Throughout this article, we have discussed several important postdoc support mechanisms. Many of these require resource investment and will consequently encounter inertia or resistance during planning and implementation. We end by appealing to funding agencies and reviewers to encourage change by carefully assessing postdoc development plans and budgeting during proposal reviews. By co-prioritizing training plans and resources, funding agencies can prevent unsustainable over-exploitation of one of science's most important assets: the postdoctoral workforce.

In summary: better support for postdocs will generate far-reaching returns

Postdocs are a vital part of the international research community and are integral to teaching and service activities at institutions around the world. Because career prospects for postdocs have changed over time, so too must the nature of their preparation for the next career stage.

We have shown here that many factors impact the quality of postdocs' personal and professional lives. Coordinated discussion and reform surrounding these factors is increasingly possible, in part due to the growing size and connectivity of the postdoc population. To leverage this emerging opportunity, we strongly encourage discourse among postdocs, home institutions, organizations, and initiatives such as the National Postdoc Association and the NIH-funded Postdoc Academy. These initiatives offer free resources for postdocs' professional development and are stimulating important dialogues.

5 We have proposed structuring postdoc-centred policies and practices around five core goals: (1) aligning career development with job prospects, (2) sustaining wellness and work-life balance, (3) enhancing mentoring, (4) developing administrative support, and (5) increasing broader support. Achieving these goals requires coordinated effort from individuals, departments, institutions, and scientific societies, and will ultimately benefit everyone involved. To facilitate and document progress, we encourage future studies of how progressive changes impact the well-being and productivity of both individual postdocs and academia at large.

10 We believe evolutionary biologists and ecologists should lead essential reforms to postdoc professional development, implementing data-driven practices that appropriately value and capacitate postdocs' extensive contributions to STEM. Our disciplines are collaborative and diverse, and our rigorous investigation of complex interactions among genes, individuals, species, and whole ecosystems have surely prepared us well to develop optimal, postdoc-centred policies and practices within our own workplace communities.

15 **References:**

1. Jaeger, A. J. & Dinin, A. J. *The Postdoc Landscape : the Invisible Scholars*. (Academic Press, 2017).
2. Rybarczyk, B., Lerea, L., Lund, P. K., Whittington, D. & Dykstra, L. Postdoctoral Training Aligned with the Academic Professoriate. *Bioscience* 61, 699–705 (2011).
- 20 3. Davis, G. Improving the Postdoctoral Experience: An Empirical Approach. in *Science and Engineering Careers in the United States: An Analysis of Markets and Employment* (eds. Freeman, R. & Goroff, D. L.) 99–127 (University of Chicago Press, 2009).
4. Feldon, D. F. et al. Postdocs' lab engagement predicts trajectories of PhD students' skill development. *Proc. Natl. Acad. Sci.* **116**, 20910–20916 (2019).
- 25 5. Holzinger, F., Schiffbänker, H., Reidl, S., Hafellner, S. & Streiche, J. Implementing measures to promote gender equality and career opportunities of early career researchers. in *Gender and Precarious Research Careers, a comparative analysis* (eds. Murgia, A. & Poggio, B.) 209–235 (Routledge, 2018).

- 5
6. Andalib, M. A., Ghaffarzadegan, N. & Larson, R. C. The Postdoc Queue: A Labour Force in Waiting. *Syst. Res. Behav. Sci.* **35**, 675–686 (2018).
7. Grinstein, A. & Treister, R. The unhappy postdoc: A survey based study. *F1000Research* **6**, 1–34 (2018).
8. National Academy of Sciences, National Academy of Engineering, Institute of Medicine *The Postdoctoral Experience Revisited*. (The National Academies Press, 2014).
9. Lancaster, A. K., Thessen, A. E. & Virapongse, A. A new paradigm for the scientific enterprise: nurturing the ecosystem. *F1000Research* **7**, 803 (2018).
- 10
10. Dietz, J. S. & Bozeman, B. Academic careers, patents, and productivity: Industry experience as scientific and technical human capital. *Res. Policy* **34**, 349–367 (2005).
11. Åkerlind, G. S. Postdoctoral researchers: roles, functions and career prospects. *High. Educ. Res. Dev.* **24**, 21–40 (2005).
12. Ferguson, K. et al. Supporting the Needs of Postdocs: 2017 National Postdoctoral Association Institutional Policy Report. *Am. Sci.* **106**, Supplement (2018).
- 15
13. Shaw, A. K. et al. Ecology Postdocs in Academia: Primary Concerns and Possible Solutions. *Bull. Ecol. Soc. Am.* **96**, 140–152 (2015).
14. Hampton, S. E. & Labou, S. G. Careers in ecology: a fine-scale investigation of national data from the U.S. Survey of Doctorate Recipients. *Ecosphere* **8**, e02031 (2017).
- 20
15. Blickley, J. L. et al. Graduate Student's Guide to Necessary Skills for Nonacademic Conservation Careers. *Conserv. Biol.* **27**, 24–34 (2013).
16. St. Clair, R. et al. The “new normal”: Adapting doctoral trainee career preparation for broad career paths in science. *PLoS One* **12**, e0177035 (2017).
17. van der Weijden, I., Teelken, C., de Boer, M. & Drost, M. Career satisfaction of postdoctoral researchers in relation to their expectations for the future. *High. Educ.* **72**, 25–40 (2016).
- 25
18. Foote, K. E. Creating a community of support for graduate students and early career academics. *J. Geogr. High. Educ.* **34**, 7–19 (2010).

19. Agarwal, R. & Ohyama, A. Industry or academia, basic or applied? Career choices and earnings trajectories of scientists. *Manage. Sci.* **59**, 950–970 (2013).
20. National Academies of Sciences, Engineering and Medicine, *Graduate STEM Education for the 21st Century*. (National Academies Press, 2018).
- 5 21. Konsortium Bundesbericht Wissenschaftlicher Nachwuchs. *Bundesbericht Wissenschaftlicher Nachwuchs 2017 : Statistische Daten und Forschungsbefunde zu Promovierenden und Promovierten in Deutschland*. (W. Bertelsmann Verlag, 2017).
- 10 22. Canal Domínguez, J. F. & Rodríguez Gutiérrez, C. Wage differences among Ph.D.s by area of knowledge: are science areas better paid than humanities and social ones? The Spanish case. *J. Educ. Work* **26**, 187–218 (2013).
23. Bloch, C., Graversen, E. K. & Pedersen, H. S. Researcher mobility and sector career choices among doctorate holders. *Res. Eval.* **24**, 171–180 (2015).
24. Derting, T. L. et al. Assessing faculty professional development in STEM higher education: Sustainability of outcomes. *Sci. Adv.* **2**, (2016).
- 15 25. Smith, B. et al. COMPASS: Navigating the Rules of Scientific Engagement. *PLoS Biol.* **11**, e1001552 (2013).
26. European Science Foundation. *2017 Career Tracking Survey of Doctorate Holders: Project report*. (Strasbourg, 2017).
27. Science Europe. *Postdoctoral Funding Schemes in Europe: Survey Report*. (Brussels, 2016).
- 20 28. The Concordat Strategy Group. *The Concordat to Support the Career Development of Researchers*. (2019).
29. Roberts, G. G. *SET for success : the supply of people with science, technology, engineering and mathematics skills : the report of Sir Gareth Roberts' review*. (HM Treasury, 2002).
- 25 30. Bubonya, M., Cobb-Clark, D. A. & Wooden, M. Mental health and productivity at work: Does what you do matter? *Labour Econ.* **46**, 150–165 (2017).

31. Evans, T. M., Bira, L., Gastelum, J. B., Weiss, L. T. & Vanderford, N. L. Evidence for a mental health crisis in graduate education. *Nat. Biotechnol.* **36**, 282–284 (2018).
32. Panger, G., Tryon, J. & Smith, A. *The Graduate Assembly Graduate Student Happiness & Well-Being Report 2014. The Graduate Assembly UC Berkeley* (2014).
33. Auriol, L., Misu, M. & Freeman, R. A. *Careers of Doctorate Holders: Analysis of Labour Market and Mobility Indicators. OECD Science, Technology and Industry Working Papers* (2013).
34. McInroy, G., Lichten, C., Ioppolo, B., Parks, S. & Guthrie, S. *International Movement and Science: A survey of researchers by the Together Science Can campaign.* (RAND Corporation, 2018).
35. Yadav, A. & Seals, C. Taking the next step: supporting postdocs to develop an independent path in academia. *Int. J. STEM Educ.* **6**, 15 (2019).
36. Hund, A. K. et al. Transforming mentorship in STEM by training scientists to be better leaders. *Ecol. Evol.* **8**, 9962–9974 (2018).
37. Recotillet, I. PhD Graduates with Post-doctoral Qualification in the Private Sector: Does It Pay Off? *Labour* **21**, 473–502 (2007).
38. Burk, H. G. & Eby, L. T. What keeps people in mentoring relationships when bad things happen? A field study from the protégé's perspective. *J. Vocat. Behav.* **77**, 437–446 (2010).
39. Lunsford, L. Doctoral Advising or Mentoring? Effects on Student Outcomes. *Mentor. Tutoring Partnersh. Learn.* **20**, 251–270 (2012).
40. Morrison, J. et al. *Recognizing and Valuing the Mentoring of Undergraduate Research , Scholarship and Creative Activity (URSCA) by Faculty Members : Workload , Tenure , Promotion , and Award Systems.* (Council on Undergraduate Research White Paper nb 2, 2019).
41. Grogan, K. E. How the entire scientific community can confront gender bias in the workplace. *Nat. Ecol. Evol.* **3**, 3–6 (2019).
42. Bruckmann, C. & Sebestyén, E. Ten simple rules to initiate and run a postdoctoral association. *PLOS Comput. Biol.* **13**, e1005664 (2017).

43. Polka, J. K., Krukenberg, K. A. & McDowell, G. S. A call for transparency in tracking student and postdoc career outcomes. *Mol. Biol. Cell* **26**, 1413–1415 (2015).
44. American Association of University Professors. *Visualizing Change: The Annual Report on the Economic Status of the Profession, 2016-2017*. *Academe* **103**, (2017).
45. Feeney, M. K., Bernal, M. & Bowman, L. Enabling work? Family-friendly policies and academic productivity for men and women scientists. *Sci. Public Policy* **41**, 750–764 (2014).
46. National Science Foundation, National Center for Science and Engineering Statistics. NCSES Survey of Graduate Students and Postdoctorates in Science and Engineering, 1972-2017: Fall 2017. *US National Science Foundation (NSF)* 1 (2017). Available at: <https://ncesdata.nsf.gov/gradpostdoc/2017/html/gss17-dt-tab001-1.html>. (Accessed: 30th January 2020)
47. Sinche, M. et al. An evidence-based evaluation of transferrable skills and job satisfaction for science PhDs. *PLoS One* **12**, e0185023 (2017).

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Fig. 1. The training of a growing postdoc workforce is poorly aligned with the current career landscape: definition (A), statistics (A and B) and necessary skills (C) to align postdoc professional development to the current job market.

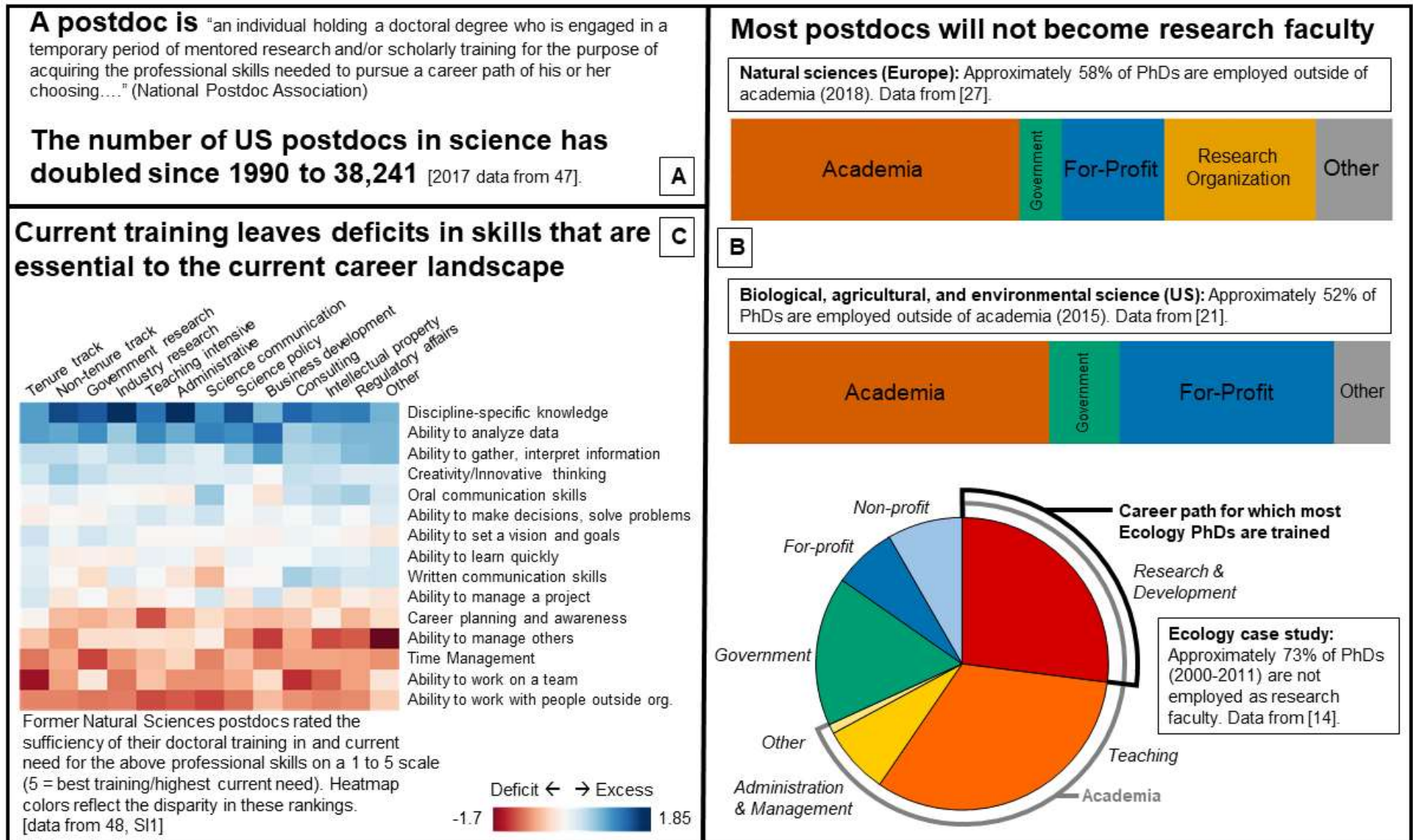


Table 1. Recommended content for postdoc handbooks. The ‘Minimum Essentials’ version consolidates relevant information that typically exists at home institutions. The ‘Better Case Scenario’ appends resources that many institutions or programs do not yet provide. The ‘Best Case Scenario’ outlines active and comprehensive efforts to support postdoctoral productivity.

	Minimum Essentials	Better Case Scenario	Best Case Scenario
Advocacy	<ul style="list-style-type: none"> External resources (National Postdoc Association, etc.) 	<ul style="list-style-type: none"> University postdoc association (run by postdocs) 	<ul style="list-style-type: none"> Campus postdoctoral office (with permanent employees)
Policy	<ul style="list-style-type: none"> Official institutional mission 	<ul style="list-style-type: none"> Postdocs explicitly integrated into campus and department missions 	<ul style="list-style-type: none"> Participatory representation (department meetings, faculty council, etc.)
Equity & Inclusivity	<ul style="list-style-type: none"> Official protective policies 	<ul style="list-style-type: none"> Diversity & inclusivity initiatives 	<ul style="list-style-type: none"> Active campus support resources
Mentoring & Oversight	<ul style="list-style-type: none"> Grievance protocol Job description & review protocols 	<ul style="list-style-type: none"> Personalized work plan encompassing research activity and career development 	<ul style="list-style-type: none"> Oversight of, and incentives for, faculty excellence in mentoring Work plan encompassing wellness
Health care & Benefits	<ul style="list-style-type: none"> Human resources information 	<ul style="list-style-type: none"> Medical and mental health coverage details Vested retirement plan 	<ul style="list-style-type: none"> Workplace wellness programs
Networking	<ul style="list-style-type: none"> Overview of 	<ul style="list-style-type: none"> Dedicated e- 	<ul style="list-style-type: none"> Physical space for

tools	home department	resources for postdocs (listserv, website, directories)	professional activities <ul style="list-style-type: none"> ● Program-specific postdoc communities
Career development	<ul style="list-style-type: none"> ● Work hours permitting career search activities 	<ul style="list-style-type: none"> ● Active support in job searching from mentor & institution 	<ul style="list-style-type: none"> ● Skills training and professional development built into work plans and evaluations
Leave policy	<ul style="list-style-type: none"> ● Statement regarding leave policies 	<ul style="list-style-type: none"> ● Progressive leave policies for parents and others in need. ● Information about external support while on leave (e.g. NSF supplemental funding) 	<ul style="list-style-type: none"> ● Temp replacements for individuals on leave
Research funding	<ul style="list-style-type: none"> ● Office of sponsored projects information 	<ul style="list-style-type: none"> ● Overview of external funding opportunities (NSH, NIH, etc.) 	<ul style="list-style-type: none"> ● Seed funding opportunities ● Administrative support for postdoc-led proposals
Travel policy	<ul style="list-style-type: none"> ● Travel policy and travel office information 	<ul style="list-style-type: none"> ● Institutional protocols for work-related travel 	<ul style="list-style-type: none"> ● Opportunities for travel support ● Interest-free loans for work-related travel
Family policy	<ul style="list-style-type: none"> ● Legally mandated protections and policies 	<ul style="list-style-type: none"> ● Elective childcare ● Family resources & inclusive work culture 	<ul style="list-style-type: none"> ● Subsidized childcare ● Backup dependent care
Alumni &	<ul style="list-style-type: none"> ● Visible 	<ul style="list-style-type: none"> ● Data on postdoc 	<ul style="list-style-type: none"> ● Active network of

Colleagues	directories of current postdocs	alumni (e.g. years at institution, home lab(s), job placement)	alumni employed in diverse sectors
Housing resources	<ul style="list-style-type: none"> • Housing office information 	<ul style="list-style-type: none"> • Off-campus housing resources 	<ul style="list-style-type: none"> • Affordable housing options that accommodate families and indefinite employment
Relocation resources	<ul style="list-style-type: none"> • General information about area 	<ul style="list-style-type: none"> • Current information (DMV office, state and city tax policies, etc.) 	<ul style="list-style-type: none"> • Relocation assistance
International postdocs	<ul style="list-style-type: none"> • International student/staff policy 	<ul style="list-style-type: none"> • International office information 	<ul style="list-style-type: none"> • Legal and tax resources for postdocs
Home lab resources	<ul style="list-style-type: none"> • Contact for the department of Environment, Health and Safety & training information 	<ul style="list-style-type: none"> • Collegial and supportive lab culture 	<ul style="list-style-type: none"> • Written policies for home lab and/or research project(s)
IT resources	<ul style="list-style-type: none"> • Email access and tech support information 	<ul style="list-style-type: none"> • Cloud access 	<ul style="list-style-type: none"> • Software licenses • Dedicated computer for work

Supplementary Figure 1: Data on salary for postdoctoral researchers from seven countries, compared to the country's median salary and the proportion of workers with MA, MS, and/or PhD degrees with earnings below and up half a median salary, over half but below or equal to the median salary, over the median but below or up to 1.5 times a median salary, over 1.5 but below or up to 2 median salaries, and over 2 median salaries. The black outlines represent the salary tiers of the average postdoc salary for a given country compared to the country's median salary. Original currencies converted to euro using exchange rates as per January 1st, 2020. Data on salaries retrieved on February 9th 2020 from the following sources: 1.) Data on median disposable income for 18-65 years old workers and on the proportion of workers with tertiary education in different salary categories for 2016 (Australia, Austria and Mexico) and 2017 (Korea, Sweden, UK, USA), from <https://stats.oecd.org/>. 2) Data on postdoctoral salaries, adjusted for average personal income tax (OECD data for 2018), from the Australian Research Council, (<https://www.arc.gov.au>), the Austrian Research Fund (<https://www.fwf.ac.at>), the National Research Foundation of Korea (<https://www.nrf.re.kr/eng>), the National Council of Science and Technology (Mexico, <https://www.conacyt.gob.mx/>), the Swedish Confederation of Professional Associations (<https://www.saco.se/>), for the UK: averaged lowest point grade 7 salaries from the universities of Oxford (<https://hr.admin.ox.ac.uk>), Cambridge (<https://www.hr.admin.cam.ac.uk>), Leicester (<https://www2.le.ac.uk/offices/hr>) and Edinburgh (<http://www.docs.csg.ed.ac.uk/HumanResources>) and the National Institute of Health (USA, <https://www.niaid.nih.gov/>).

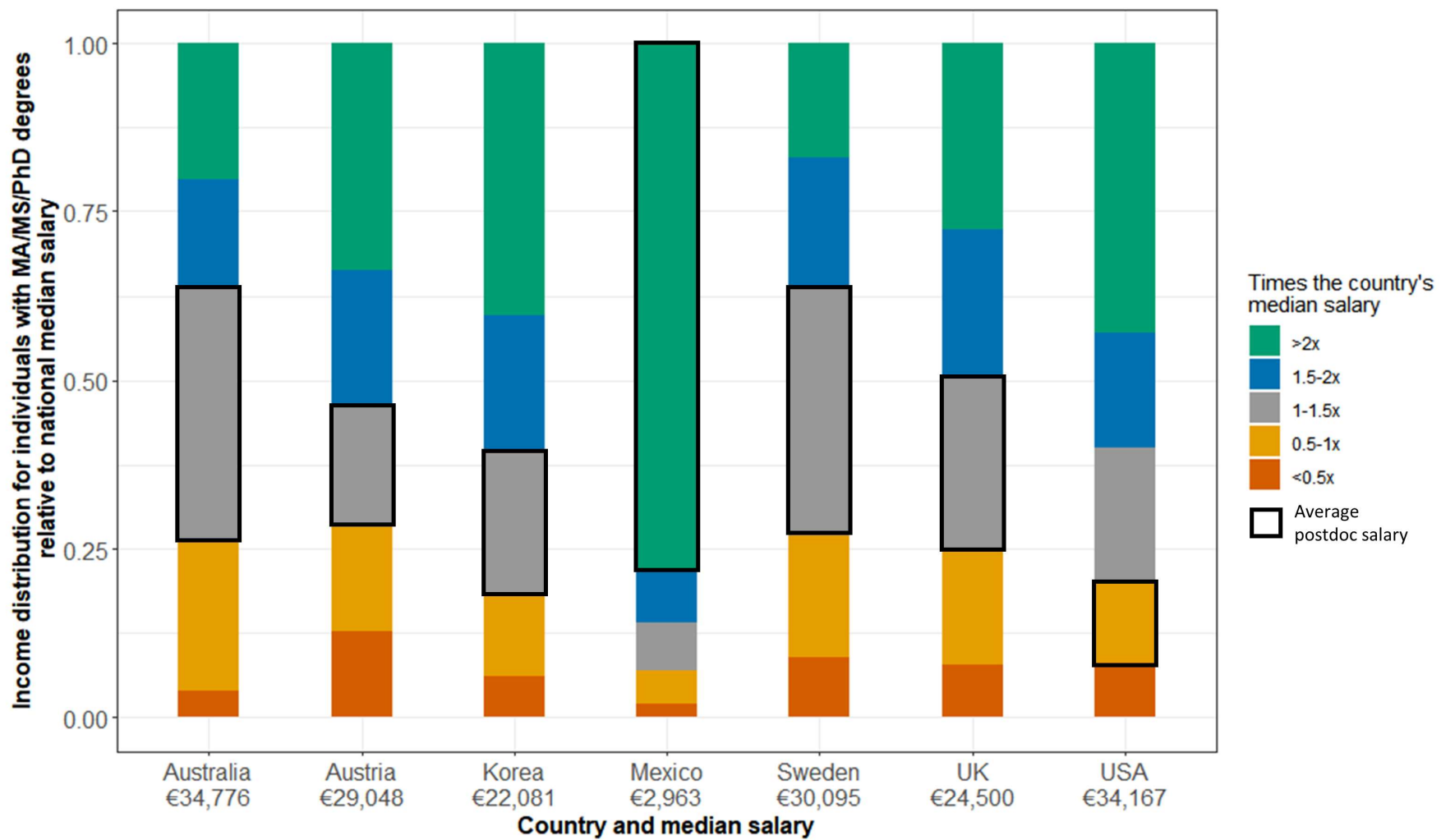


Table S1: Data on costs and resources for a sample of 34 conferences in ecology and evolutionary biology taking place between 2018 and 2020. Conferences selected were those the authors attended in the past three years. Registration costs, the availability of grants and scholarships for postdocs and mentions of on-site childcare services were obtained from conference websites, up to date as per July 11 2019, and fees converted to Euro US\$ for easier comparison, exchange rate as per January 1st, 2020.

Conference/Society meeting	Student registration (US\$)	Postdoc registration (US\$)	Faculty registration (US\$)	On-site childcare ?	Postdoc travel funding?	% Postdoc increase from student rate	% Postdoc reduction from full rate	% Student reduction from full rate	Source
American Fisheries /Wildlife Society	285	339	490	yes		19%	31%	42%	https://afstws2019.org/
Alife	284		541			90%	0%	47%	https://2019.alife.org/
Animal Behavior	129		330			155%	0%	61%	http://www.animalbehaviorsociety.org/2019/
American Ornithological Society	263	339	401			29%	16%	34%	https://amornithmeeting.org/
Association for the Study of Animal Behaviour	160		259	yes	yes	62%	0%	38%	https://www.uni-konstanz.de/asab-summer-2019/registration-and-abstract-submission/
American Society for Cell Biology/European Molecular Biology Organization	89	241	263		yes	170%	8%	66%	https://www.ascb.org/2019ascbembologyregistration/
American Society of Human Genetics	187		415	yes	yes	0%	55%	55%	http://www.ashg.org/2019meeting/pages/registration.shtml
Botany	205	339	401	yes		65%	16%	49%	https://2019.botanyconference.org/
Cosyne	264	264	373		yes	0%	29%	29%	http://www.cosyne.org/c/index.php?title=Cosyne_19
Drosophila	178	272	305		yes	53%	11%	42%	http://conferences.genetics-gsa.org/drosophila/2019/register
Ecological Society of America	174		348	yes	yes	100%	0%	50%	https://esa.org/louisville/
Entomological Society	183	352	432			93%	19%	58%	https://www.entsoc.org/about/esa

of America									
Euro Evo Devo	285		357			25%	0%	20%	http://www.evodevo2018.eu/ehome/evodevo2018/Welcome/
European Ornithologists' Union Congress	156		294			89%	0%	47%	https://conference.eounion.org/2019/welcome/
European Society for Evolutionary Biology	219		383	yes	yes	75%	0%	43%	https://eseb2019.fi/
Evolution	290	365	441	yes	yes	26%	17%	34%	https://www.evolutionmeetings.org/evolution-2019---providence.html
Genetics and Evolutionary Computation Conference	349		697			100%	0%	50%	https://gecco-2019.sigevo.org/index.html/HomePage
World Congress of Herpetology	437		722	on demand		65%	0%	36%	http://www.wchnz.com/wch2020
International Congress for Conservation Biology	222		441			99%	0%	50%	https://conbio.org/mini-sites/iccb-2019/registration/registration/
International Ornithology Congress	352	352	686			0%	49%	49%	https://www.iocongress2018.com/
International Union for the Study of Social Insects	193		320	yes		65%	0%	40%	https://www.iussi2018.com
International Zebrafish Conference	392	437	526		yes	11%	17%	25%	http://2019izfc.suzhou.zfish.cn/registration-member.html
Joint Meeting of Ichthyologists and Herpetologists	218		343	yes		57%	0%	36%	https://conferences.k-state.edu/JMIH/
Mammalogy	178		312		yes	75%	0%	43%	https://www.mammalmeetings.org
The American Society of Parasitologists	201	312	379			56%	18%	47%	http://parasitologists.allenpress.com/parasitologists/2019AnnualMeeting.aspx
Plant and Animal Genomes	406		611			51%	0%	34%	https://www.intlpag.org/2019/
Plant Biology	406	441	588	yes		9%	25%	31%	https://plantbiology.aspb.org/

Society for Developmental Biology	259	330	410		yes	28%	20%	37%	https://www.sdbonline.org/2019mtg
Society for Experimental Biology	259	259	446	yes	yes	0%	42%	42%	https://www.sebiology.org/events/event/seb-seville-2019
Society for Freshwater Science	280		391			40%	0%	28%	https://sfsannualmeeting.org/Registration.cfm
Society for Integrative and Comparative Biology	97	205	303	yes		111%	32%	68%	http://www.sicb.org/meetings/2018/fees.php
Society for Molecular Biology and Evolution	241	316	348	yes	yes	31%	9%	31%	http://smbe2019.org/registration/
Society for Neuroscience	187	281	383	yes	yes	50%	25%	51%	https://www.sfn.org/Meetings/Neuroscience-2019
Society for Scientific Exploration	49		267			444%	0%	82%	https://www.scientificexploration.org/conferences/2019

Table S2: Data on salary for postdoctoral researchers from eight countries, compared to the country's median disposable income and the % of workers with a master's or PhD degree with earnings below and up to half a median salary, over half but below or equal to the median salary, over the median but below or up to 1.5 times a median salary, over 1.5 but below or up to 2 median salaries, and over two median salaries. Original currencies converted to euro using exchange rates as per January 1st, 2020. Salaries adjusted for taxes using average personal income tax data for each country as of 2018 from <https://stats.oecd.org/>. Data on median disposable income for 18-65 years old workers and on the proportion of workers with tertiary education in different salary categories for 2015 (Japan), 2016 (Australia, Austria and Mexico) and 2017 (Korea, Sweden, UK, USA), retrieved on February 9th, 2020 from <https://stats.oecd.org/>. Data on postdoctoral salaries and median salaries for each country retrieved from each source as of February 9th, 2020.

Country	Postdoc salary, after taxes [Euro]	Median disposable income, 18-64 years old workers, [Euro]	% of 25-64 year old full time workers with a Master's, PhD degree or equivalent, earning a salary in each category					Sources for postdoctoral salaries
			<= ½ median salary, [%]	>½<= 1 median salary, [%]	>1<= 1.5 median salary, [%]	>1.5<= 2 median salary, [%]	>2 median salary, [%]	
Australia	37,911	34,776	4	22	37	16	20	-Postdoc salary for a DECRA fellowship in 2019, from the Australian Research Council, https://www.arc.gov.au
Austria	30,675	29,048	13	16	18	20	34	-Postdoc salary information from the Austrian Research Fund (FWF) 2019

								https://www.fwf.ac.at/en/research-funding/personnel-costs/
Japan	27,676	22,467	NA	NA	NA	NA	NA	-Postdoctoral fellowship for research in Japan from the Japan Society for the Promotion of Science in 2019, https://www.jsps.go.jp/english/e-ippan/index.html
Korea	32,840	22,081	6	12	21	20	40	-Postdoctoral fellowship from the National Research Foundation of Korea in 2019, https://euraxess.ec.europa.eu/jobs/funding/korea-research-fellowship-krf-2019-foreigner-postdoctoral-researchers
Mexico	11,684	2963	2	5	7	8	78	-Postdoctoral fellowship from the National Council of Science and Technology (<i>CONACYT</i>) for 2019, https://www.conacyt.gob.mx/index.php/el-conacyt/convocatorias-y-resultados-conacyt/convocatorias-estancias-posdoctorales-nacionales/convocatorias-cerradas-estancias-posdoctorales-nacionales/18981-conv-epn-1er-19-1/file
Sweden	30,827	30,095	9	18	37	19	17	-Median postdoc salary for 2018 from the Swedish Confederation of Professional Associations (SACO), https://www.saco.se/

UK	29,649	24,500	8	17	26	22	28	-Salary for a postdoc with lowest point grade 7 averaged between data from the universities of Oxford (2019), Cambridge (2019), Leicester (2017) and Edinburgh (2019) ,https://hr.admin.ox.ac.uk/files/pers1906-annexeapdf , https://www.hr.admin.cam.ac.uk/files/single_salary_spine_as_at_1_august_2019.pdf , https://www2.le.ac.uk/offices/hr/docs/pay/scales/singlepayspine.pdf/view , http://www.docs.csg.ed.ac.uk/HumanResources/Pay/UE01_to_UE10_Aug19.htm
USA	33,962	34,167	8	12	20	17	43	-Starting postdoctoral salary for a fellowship from the National Institute of Health in 2019, https://www.niaid.nih.gov/

Rank	Institution	Country	OPA	PDA	dept OPA	dept PDA	other	comment	links
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Table S3: Results of a survey of the websites of 51 of the top 101 ranked universities according to the Times Higher Education World University Rankings 2020 for a mention of an Office for Postdoctoral Affairs (OPA, or an equivalent office, employing administrators in charge of postdoctoral affairs) or a volunteer-based, postdoc-led Postdoctoral Association (PDA). We selected universities ranked as 1-25 and 75-101 in order to get a wide representation of just over 50 of the 100 of the most highly ranked universities worldwide, selecting only institutions offering “Biological Sciences” as one of the subjects. Departmental OPA or NPA refer to offices or associations specific to a department or subdepartment, but not offering university-wide services. “Other” includes cases where postdoctoral affairs are included within the graduate school or an office for career development, the existence of a postdoctoral handbook, and mentoring or professional development programs or courses offered specifically for postdoctoral researchers/fellows. A “YES” indicates the presence of contact information or relevant details on the institution’s website as of January 2020, while “NA” means that no information could be found online. Note that for the universities of Tsinghua, Peking, Sungkyunkwan and the university of Science and Technology of China, more information might have been available that the authors were not able to read.

1	Oxford	UK	NA	NA	NA	YES	NA	PDAs: departments of chemistry, molecular medicine and pathology, physiology, anatomy and genetics	
2	Caltech	USA	YES	NA	NA	NA	YES	Postdoc handbook	https://provost.caltech.edu/ProvostOrgs/postdoctoral-scholars-office
3	Cambridge	UK	YES	YES	NA	NA	NA		https://www.opda.cam.ac.uk/aboutus
4	Stanford	USA	YES	NA	NA	NA	NA		https://postdocs.stanford.edu/about
5	MIT	USA	NA	YES	NA	NA	NA		https://pda.mit.edu/about/who-are-we/
6	Princeton	USA	NA	YES	NA	NA	NA	Postdoctoral council	https://pdc.princeton.edu/about-us
7	Harvard	USA	NA	NA	YES	YES	NA	OPA & PDA: faculty of Arts and Science, Medical School & School of Dental Medicine	https://postdoc.harvard.edu/about-us https://postdoc.hms.harvard.edu/
8	Yale	USA	YES	YES	NA	NA	NA		https://postdocs.yale.edu/
9	University of Chicago	USA	NA	NA	YES	YES	NA	OPA & PDA: Biological science department, university-level: postdoctoral issues under the graduate school	https://bsdpostdoc.uchicago.edu/pdo/
10	Imperial College	UK	YES	NA	NA	NA	NA	Postdoc and Fellows Development Center	https://www.imperial.ac.uk/postdoc-fellows-development-

									centre/postdocs/
11	University of Pennsylvania	USA	NA	NA	YES	YES	NA	Biomedical Postdoctoral Programs and PDA	https://www.med.upenn.edu/postdoc/
12	John Hopkins University	USA	NA	NA	NA	YES	NA	PDAs: department of Engineering, Art & Science and Medicine, public health and nursing	http://postdoc.jhu.edu/association/ https://jhpdajhmi.edu/about-us/
13	ETH Zurich	Switzerland	NA	YES	NA	YES	NA	Subgroup of the university-wide staff association dedicated to postdocs, PDA at the department of biochemistry	https://www.aveth.ethz.ch/postdoc/
13	UC Berkeley	USA	YES	YES	NA	NA	NA	Office for Visiting Scholar and Postdoctoral Affairs	https://vspa.berkeley.edu/postdoc-campus-resources
15	UCL	UK	NA	NA	NA	YES	NA	Divisional Postdoctoral Committee at the department of biological sciences	https://www.ucl.ac.uk/biosciences/support-postdoctoral-researchers
16	Columbia University	USA	YES	YES	NA	NA	NA		https://research.columbia.edu/office-postdoctoral-affairs
17	UCLA	USA	NA	NA	YES	NA	YES	Postdoctoral Scholar Appointments & Services: part of the graduate school, OPA:biomedical and life sciences	https://www.postdoc.ucla.edu/about-us/ https://www.biomedpostdoc.ucla.edu/
18	University of Toronto	Canada	NA	YES	NA	NA	NA		https://www.utm.utoronto.ca/dean/postdocs/utm-board-postdocs
19	Cornell	USA	NA	NA	YES	YES	NA	OPA and PDA at the Weill	https://postdocs.weill.cornell

	University							Cornell Medicine school	edu/about-us
20	Duke University	USA	YES	YES	NA	NA	NA		https://postdoc.duke.edu/
21	University of Michigan	USA	NA	YES	YES	NA	NA	Office of graduate and postdoctoral studies at the medical school	https://umpda.rackham.umich.edu/about/ https://ogps.med.umich.edu/post-docs/#partners
22	Northwestern University	USA	YES	YES	NA	NA	NA		https://postdocs.northwestern.edu/index.html
23	Tsinghua University	China	YES	YES	NA	NA	NA	Postdoctoral Management Office & PDA	http://postdoctor.tsinghua.edu.cn/ http://postdoctor.tsinghua.edu.cn/info/bshjj/1075
24	Peking University	China	YES	NA	NA	NA	NA	OPA & postdoctoral affair coordinators at several departments.	http://kiaa.pku.edu.cn/articles/peking-university-boya-postdoctoral-fellowship-call-applications-2018
25	National University of Singapore	Singapore	NA	NA	NA	YES	NA	PDA:Young Loo Lin school of medicine	http://nusmedicine.nus.edu.sg/medical-sciences-cluster/join-us/
75	Monash University	Australia	NA	NA	NA	NA	NA		
75	Utrecht University	Netherlands	NA	NA	NA	YES	NA	PDA: graduate school of life sciences Postdoc Network Utrecht	https://www.uu.nl/en/education/graduate-school-of-life-sciences/postdocs/useful-links-and-contacts

77	University of Warwick	UK	NA	NA	NA	NA	NA		
78	Penn State University	USA	YES	YES	NA	NA	NA		https://www.research.psu.edu/opa
79	University of Minnesota	USA	YES	YES	NA	YES	YES	Office of postdoctoral initiatives, Biological sciences postdoc handbook	https://grad.umn.edu/postdocs
80	University of Science and Technology of China	China	NA	NA	NA	NA	NA		
80	Université de la Sorbonne	France	NA	NA	NA	NA	NA		
80	Emory University	USA	NA	NA	YES	YES	NA	Office of postdoctoral education and PDA: School of medicine	https://med.emory.edu/education/postdoctoral-training/index.html
84	Michigan State University	USA	YES	YES	NA	YES	NA		https://grad.msu.edu/PDO
85	University of Montreal	Canada	NA	NA	NA	NA	YES	Postdoc fellow handbook	https://esp.umontreal.ca/fileadmin/esp/documents/PDF/GuideStagiairePostdoctoral_Eng.pdf
86	University of Freiburg	Germany	NA	NA	NA	NA	YES	Postdoctoral mentorship/training program for postdocs at the center of excellence in neurotechnology: brainlinks/braintools	https://www.brainlinks-braintools.uni-freiburg.de/post-graduate-program/

87	University of Bristol	UK	NA	NA	NA	NA	NA		
88	Purdue University	USA	YES	YES	NA	NA	NA		https://www.purdue.edu/gradschool/postdoctoral-studies/
89	Sungkyunkwan University	South Korea	NA	NA	NA	NA	NA		
90	University of Zurich	Switzerland	YES	NA	NA	NA	NA	OPA is part of the graduate school	https://www.grc.uzh.ch/en/phd-postdoc.html
91	University of Tübingen	Germany	NA	NA	NA	NA	YES	PACE: Postdoctoral Academy for Research on Education LEAD research network, competitive program for 15 fellows.	https://uni-tuebingen.de/en/faculties/faculty-of-economics-and-social-sciences/subjects/departments-of-social-sciences/education-sciences-and-psychology/karrieren/postdocs/
91	University of Maryland	USA	YES	NA	NA	NA	YES	Postdoc manual	https://gradschool.umd.edu/postdocs/postdoctoral-manual
93	École Polytechnique	France	NA	NA	NA	NA	NA		
94	University of Basel	Switzerland	NA	YES	NA	YES	NA	Basel Postdoc Network: annual meetings, Biozentrum postdoc club, department of biomedicine postdoc club	https://postdocretreat.biozentrum.unibas.ch/ https://postdoc.biozentrum.unibas.ch/ https://biomedizin.unibas.ch/

								en/education-careers/post-doc/
94	Dartmouth College	USA	NA	YES	NA	NA	NA	https://sites.dartmouth.edu/dcpda/
96	University of Helsinki	Finland	NA	YES	NA	NA	NA	https://blogs.helsinki.fi/viikki-postdoc/stuff/
96	Lund University	Sweden	NA	YES	NA	NA	YES	Postdoc Career Success: mentoring and professional development program for postdocs https://postdoctraining.com/postdoc-career-success-for-lund/
96	UC Irvine	USA	YES	YES	NA	NA	YES	Postdoc handbook https://grad.uci.edu/about-us/postdoctoral-scholars/ https://pda.grad.uci.edu/ https://www.grad.uci.edu/forms/postdoctoral-scholars/UCIPostdoctoralScholarBooklet_10_16_2018.pdf
99	RWTH Aachen	Germany	NA	NA	NA	NA	YES	Postdocs included in the "center for professional leadership" https://www.rwth-aachen.de/cms/root/Forschung/Angebote-fuer-Forschende/RWTH-Center-for-Young-Academics/~pseg/Postdocs/lix/1/
99	University of Glasgow	UK	NA	YES	NA	NA	NA	Postdoctoral Research Forum https://www.gla.ac.uk/myglasgow/ris/researcherdevelopm

									ent/ecrstrategy/postdoctoralresearcherforum/
101	University of Copenhagen	Denmark	NA	NA	NA	YES	YES	PDA: Center for Stem Cell Research & Developmental Biology; Postdoc Career programme: Biotech Research & Innovation Centre; Student & Postdoc Association: Novo Nordisk Foundation Center for Protein Research	https://danstem.ku.dk/education-and-training/danstem-postdoc-association/ https://ism.ku.dk/test-sider/euraxess/boxes/resources/Take_care_of_your_postdoc_career_2018.pdf