

Unseen Workers in the Academic Factory: Perceptions of Neoracism Among International Postdocs in the United States and the United Kingdom

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In this article, Brendan Cantwell and Jenny J. Lee examine the experiences of international postdocs and their varying career paths in the current political economy of academic capitalism through the lens of neoracism. Using in-depth interviews with science and engineering faculty and international postdocs in the United States and the United Kingdom, the authors identify differing faculty expectations and treatment of international postdocs. They further reveal culturally specific stereotypes that negatively affected postdocs' work opportunities as they moved toward their professoriate career. The authors extend the concept of neoracism in globalized higher education by examining the larger structures of the academic job market and varying degrees of opportunity, depending on one's country of origin as reported by faculty and postdocs.

Today there are more postdocs than ever before; a higher percentage of all PhD's elect to do a postdoc, and a greater number of postdocs work outside of their home countries (Ackers & Gill, 2005; Hoffer, Grigorian, & Hedberg, 2008). Completing a postdoc is now a near-requisite step for research careers, particularly in many scientific disciplines (NRC, 2005). Researchers have observed a neoliberal shift in higher education in which there has been

increasing reallocation of resources toward fields that are more closely aligned with the market and a greater reliance on temporary and part-time faculty and researchers (Giroux, 2002; Slaughter, 1993; Slaughter & Rhoades, 2004). Similarly, as the United States and United Kingdom continue as global leaders in science production but experience domestic skill shortages, they increasingly rely on postdocs from abroad (Ackers & Gill, 2005; Corley & Sabharwal, 2007). In both sets of observations, the patterns reflect the political economy in which academic production has been globalized and are, in part, reliant on the cross-border mobility of workers (Castells, 2000; Held, McGrew, Goldblatt, & Perraton, 1999).

Postdocs are a significant but largely overlooked academic labor market in educational research. The last major study on postdocs in the United States was published a quarter-century ago (Zumeta, 1985). Today, the postdoctorate refers to the period in a researcher's career beyond the terminal degree but before that person has become an independent researcher. The National Science Foundation and National Institutes of Health define a postdoc as

an individual who has received a doctoral degree (or equivalent) and is engaged in a temporary and defined period of mentored advanced training to enhance the professional skills and research independence needed to pursue his or her chosen career path. (Bravo & Olsen, 2007, para. 2)

Yet, it is difficult to capture postdoctoral experience using a simple definition, and any single definition may be inadequate to describe the diverse duties and conditions of postdoctoral work. Postdocs are not students, though training is the manifest function of the postdoctorate. They are not faculty members (postdocs do not necessarily teach or do service), but they are expected to direct academic research projects.

Purpose

This study is rooted within the phenomenon of higher education internationalization, which is widely acknowledged as significant to the contemporary operation of colleges and universities. Internationalization is prominent among a range of important higher education topics, including public policy and higher education finance (Dill, 1997), academic labor markets (Alexander, 2001), and organizational change (Kezar, 2006). Researchers have examined topics such as the global strategic positioning of American research universities (Gaffikin & Perry, 2009), the extent to which universities prepare students to succeed in a globalized marketplace (Jayakumar, 2008), and the discourse surrounding international students (Rhee & Sagaria, 2004) but have largely overlooked less visible aspects of globalization in higher education, such as the growing internationalization of the research labor force and lived experiences in the internationalized academy. For example, few studies address international faculty, and even less research has addressed international postdocs.

Moreover, most research addressing international higher education does not take a cross-national or comparative approach.

Given the limited scholarly understanding of international postdocs, this population is the focus of our study. These researchers represent a significant component of the academic labor market that many universities, particularly their science and engineering departments, rely on (Ackers & Gill, 2005; NRC, 2005; Stephan & Levin, 2001). Yet, due to their temporary status and varying responsibilities and rights, postdocs tend to be less visible and less studied than students, staff, and faculty. Previous research has also suggested that educational migrants have different experiences based on their region of origin, and those from developing countries are especially prone to mistreatment (Lee & Opio, in press; Lee & Rice, 2007). Thus, this study examines international postdocs' varying structures of work opportunities and experiences in western countries (i.e., the United States and United Kingdom). International postdocs' experiences in both American and British universities are included in this study; we examine the interaction between their localized experiences with global educational processes as mediated by regional and institutional contexts (Arnove, 2003). This approach permits a deeper analysis of how regional context and immigration conditions affect international scholars' work and perceptions in the Anglo-American academy than could be accomplished in a single national setting. It also addresses some of the questions identified as paramount for the future of comparative educational research, including patterns of privatization, corporatization, justice, and equity (Stromquist, 2005).

International Mobility in the United States and United Kingdom

Educational mobility in American and British higher education has extended beyond national boundaries. Today, the United States and United Kingdom are leading destinations for internationally mobile students and academics. In 2005, the 590,167 students from abroad who were enrolled in U.S. higher education institutions accounted for 22 percent of all international students worldwide (OECD, 2007). One reason that students are attracted to the United States is because of the prestige of American higher education. Many American universities are ranked among the top institutions in major world university rankings (i.e., Institute of Higher Education of Shanghai Jiao Tong, 2010; *The Times*, 2010). Other reasons for their international draw include the scope of educational opportunities, level of educational development, and the widespread use of English (Altbach, 1998). Given the size, prestige, research productivity, international appeal, and use of English in science worldwide, the United States is unarguably the global leader in higher education (Marginson, 2007).

Like the United States, the United Kingdom attracts a large number of international students, and its higher education system is well regarded around the

world. In 2005, 318,399 students from abroad were enrolled in U.K. universities, accounting for 12 percent of all international students (OECD, 2007). These numbers are second only to the United States in absolute terms, and a relatively large share of all students enrolled in U.K. universities come from abroad (OECD, 2007). A handful of U.K. institutions are part of what Marginson (2007) calls the “super league” of universities, and Altbach (1998) places the U.K. higher education system at the core of the world system of higher education. Only the United States has greater representation in the various world university rankings.

Postdoctoral Trends

Since there are more data on postdocs in the United States than anywhere else in the world, including the United Kingdom, it is useful to review some of the available data on these appointments to get an idea of the general trends. First, as summarized in table 1, there were more than 50,000 postdoc appointments in U.S. higher education institutions in 2007, an increase of 27 percent from 1998. In 2005, there were 148,230 tenure-track science, technology, engineering, and math (STEM) faculty members in the United States (IPEDS, 2009; NSF, 2009), indicating that there is about one postdoc for every three STEM faculty members. These data demonstrate substantial absolute and relative growth in postdoctorate positions. Moreover, a higher share of all PhD recipients now work as postdocs. From 2002 to 2007, 45 percent of all PhD recipients spent a period of time as a postdoc (Hoffer et al., 2008). This figure does not include postdocs in the United States who completed their degrees abroad, and over the past several years, more than half of all international PhD's came from abroad (NRC, 2005). In 2007, over 56 percent of all postdocs in the United States were temporary visa holders (table 1). Finally, there has been rapid growth in the number of postdoctoral appointments in many fields. In 2005, postdoc positions were most numerous in basic science fields (30,374), followed by health fields (14,066) and engineering (4,161). Given the prominence of biology in the sciences and health fields, it is clear that the life sciences lead all fields in terms of total numbers of postdocs. While there are relatively few postdocs in engineering, the field is notable because of the rate at which the number of engineering postdocs has increased in recent years. From 1998 to 2005, the number of engineering postdocs increased by 46 percent, but only 16 percent in health fields and 9 percent in the basic sciences, including the life sciences (NSF, 2009).

The same trends are largely true in Europe. The number of postdocs is increasing in all disciplines, but postdoctoral positions are still most common in the life sciences in France, Germany, and the United Kingdom (Musselein, 2004). A study of the labor market for “early career researchers” in English universities offers some insight on postdoc trends in the United Kingdom (Ackers & Gill, 2005). The term *early career researcher* is not synonymous with

TABLE 1 *U.S. postdoctoral appointments, 1998–2007*

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
International postdocs	20,376	21,916	23,663	24,932	25,371	27,065	27,084	27,048	28,196	28,737
Domestic postdocs	19,710	18,884	19,452	18,379	19,663	19,663	20,156	21,507	21,147	22,103
Total	40,086	40,800	43,115	43,311	45,034	46,728	47,240	48,555	49,343	50,840

Source: NSF (2009).

but roughly equivalent to the term *postdoc*. An early career researcher is an academic worker who has completed his or her PhD within the past five years and is employed through a temporary contract. Most early career researchers are employed in postdoc jobs; however, a postdoc who received a doctorate more than five years ago is no longer considered an early career researcher. Ackers and Gill's study presents data on early career appointments for only one year, 2002–2003. During that time span, there were 22,090 early career researchers in English universities, accounting for a fifth of all academic appointments. Furthermore, early career researchers are the fastest growing group of academic appointments at English universities. Among all early career researchers in 2002–2003, 38 percent were U.K. nationals, 14 percent were from the rest of the European Union (EU), 9 percent from Asia, 4 percent from North America, and 11 percent from the rest of the world (Ackers & Gill, 2005, p. 287). Part of the reason for such a high percentage of early career researchers from abroad, they argue, is because relatively few U.K. nationals chose to pursue academic careers, especially in the sciences. Ackers and Gill conclude, "International recruitment is absolutely critical for the stability of the [English university] system at present time" (p. 294).

Postdoctoral Employment

Although there is a clear trend toward increased numbers of postdocs and increasing internationalization of the postdoctorate, the role and experiences of postdocs in general, and international postdocs in particular, are not well known. The information that does exist suggests that postdocs are highly productive scientists but that postdoctoral employment is no longer a clear stepping-stone to a faculty career.

Postdocs are first authors of nearly half of all papers published in the journal *Science* (Vogel, 1999). One recent study found that in the United States, international scholars are more likely to work as postdocs than domestic scientists, and, overall, researchers from abroad are more productive than U.S. nationals in terms of numbers of papers published each year (Corley & Sabharwal, 2007). Another study from the United States found that in the biological sciences, 75 percent of all postdocs believed that postdoctoral train-

ing is important for academic career advancement, but only 35 percent of men and 34 percent of women were in tenure-track academic jobs five years after entering postdoctoral employment (Nerad & Cerny, 1999). Data from the National Science Foundation (NSF) show that around half of all former postdocs employed in the United States are working at educational institutions and half in industry and government, but they do not indicate if former postdocs in academic posts hold tenure-track or contingent positions (Hoffer et al., 2008).

Another national report shows that an increasing number of PhD's undertake postdoctoral work and fewer become tenure-track faculty members on graduation. From 1973 to 1999, the percentage of biologists within one to three years of earning their doctorates who were employed as faculty members dropped from over 80 percent to about 40 percent. For the first time, in 1995, a greater share of early career biologists were employed as postdocs than as faculty members at U.S. universities (Goldman & Marshall, 2002). A qualitative study on the European academic labor market found that faculty members are eager to employ postdocs from abroad but that they do not see these international postdocs as future faculty members (Musselin, 2004). All of these data suggest that academic science is produced under more rigid labor conditions than in the past; there is less career mobility now, and more junior researchers are beholden to senior academics. As Orfeu Buxton, cofounder of the National Postdoc Association, put it, the postdoc has become an "obligatory credential, necessary but not sufficient to establish a young investigator's potential for other independent research jobs" (quoted in Goldman & Marshall, 2002, p. 41).

What Makes Postdocs International?

Like the term *postdoc* itself, the definition of what makes a postdoc international is not straightforward. One way of defining postdocs as international is to include individuals who are not citizens or permanent residents of the country in which they are working. At face value, this definition is straightforward: international postdocs hold visas that allow them to work as university researchers. In the United States, this definition generally captures the legal distinction between international and domestic postdocs. However, in the United Kingdom, postdocs from other European Union countries may work without visas. In this study, postdocs identified themselves as "international" based on their country of origin. Both countries use immigration and scientific funding policies to attract researchers from abroad (Cantwell, 2009).

In both the United States and the United Kingdom, strategies to attract postdocs are not met with corresponding strategies to provide employment security (Sachar, 2006; Tremblay, 2005). Universities are able to generate a surplus of academic production through temporary postdoc labor without having to invest in long-term faculty hires (Cantwell, 2009). While host countries benefit from academic research produced by relatively cheap labor (compared to

hiring full-time, permanent faculty) (Borjas, 2006), the international postdoc may not similarly benefit (Smith-Doerr, 2006; Stephan, 2005). International postdocs from developing countries may be particularly disadvantaged in their career trajectory if their home countries do not have the necessary equipment and labs to support their research.

Varying Experiences and Structures of Opportunity

Beyond the legal status distinction between domestic and international postdocs, there are many other important differences between the two groups, regardless of the host country. In a national comparison study of foreign-born and U.S.-born scientists, Corey and Sabharwal (2007) found that foreign-born scientists demonstrated higher levels of research productivity than their U.S.-born counterparts in all areas, including patents, articles, books, and conference papers, as measured by the 2001 NSF Survey of Doctorate Recipients. They also found that despite being more productive, these international researchers indicated lower salaries and levels of work satisfaction than their U.S.-born peers. While this research includes faculty and does not clearly delineate between international versus foreign-born (the former referring to visa and citizenship status, the later to place of birth), the authors did find that the foreign-born scientists were more likely to be postdocs than were the U.S.-born scientists. We can further assume that the differences would be even more pronounced when comparing domestic versus international postdocs. Even within the United Kingdom, European postdocs possess distinct cultures, do not necessarily speak English as a first language, and have expressed feeling “foreign” in the United Kingdom (Cantwell, 2009).

Individuals’ identities can correspond to varying structures of opportunity. Past research has documented well how gender, for example, is associated with differential pay and resources. In her national study of faculty salaries in the United States, Bellas (1997) found that faculty in disciplines with higher proportions of women experience significantly lower salaries than those in disciplines with fewer women. Her findings further demonstrated that labor market conditions do not account for such variation in salaries. Similarly, Volk, Slaughter, and Thomas (2001) showed that departments with a higher proportion of males than females benefit from greater research allocations. This “two-tier labor force” consists of the “haves” and “have nots,” with the “have nots” characterized as having low faculty pay, high student loads, and a high proportion of temporary faculty, and as consisting of mostly women faculty and students (Slaughter, 1993, p. 276). A faculty member’s race has also been shown to be highly related to the extent and meaning of university service (Baez, 2000). Diversity-related service activities constitute a considerable proportion of underrepresented minority faculty activities yet remain less valued in the tenure or promotion process than research and teaching (Stanley, 2006). Such varying financial and employment structures based on one’s per-

sonal background can impact professional advancement and future success. As it relates to postdocs, research has demonstrated that PhD's on temporary U.S. visas on average spend longer in postdoc positions than U.S. citizens (Stephan & Ma, 2005). Moreover, a survey of over three thousand postdocs working in the United States found that international postdocs work longer hours and are paid less than their domestic counterparts (Davis, 2005).

Theoretical Frameworks

In order to observe the global political economy and academic labor relationships among the United States, United Kingdom, and sending countries, this study utilizes the theory of academic capitalism and the concept of neoracism. While academic capitalism theory (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004) is the contextual lens through which we explain the role of the global market in hiring postdocs, neoracism is the primary lens we use to uncover the hidden cultural stereotypes that dictate the hiring choices and subsequent experiences of some international postdocs.

Academic capitalism suggests that colleges and universities across the world are becoming increasingly aligned with the market, often at the expense of the public good. According to Slaughter and Leslie (1997) and Slaughter and Rhoades (2004), entrepreneurial interests have superseded universities' public responsibilities. Knowledge has become a commodity in the postindustrial economy. As university research productions and educational services are being developed and sold in the private marketplace, for-profit motives have increasingly dominated university functions and reshaped academic labor (Slaughter & Rhoades, 2004). As it relates to postdoctoral labor, the roles of postdocs are less as apprentices in training and more as temporary employees. The postdoctoral career trajectory, then, becomes the employment end rather than an educational means toward the faculty career (Cantwell, 2009). According to academic capitalism, postdocs then become a captive market for research production that can be exploited to serve private interests.

Not all postdocs, however, are equally vulnerable in the new knowledge-based economy. Neoracism suggests a racial hierarchy that is sociological and based on differences among nationalities as well as differences in ethnicity and phenotype (Balibar, 2005, 2007; Farnen, 2000) that "justif[y] discrimination toward an alleged 'underclass'" (Farnen, 2000, p. 243). An ordering of cultural superiority is not perceived as "racist" but justified as a practical and necessary means to preserve national identity and values. The host society is positioned as superior to outsiders not because of essentialized biological superiority but because of its culture. Neoracist constructions subsequently legitimize exclusion, denial of rights, and mistreatment toward "foreigners" while maintaining desired power relationships. In other words, neoracism is a framework to explore structural racism in the context of immigration where race, culture, and nationality interact complexly to produce a hierarchy of social positions.

While Balibar (2005, 2007) discusses neoracism as it pertains to immigrants in France, Lee and Rice (2007) apply this concept to explain the unequal treatment encountered by international students in the United States. The researchers uncovered a range of neoracist encounters, ranging from verbal insults to physical assaults, that stemmed from being perceived as unwelcome outsiders to the United States. Subsequent research has demonstrated that not all international students experience discrimination; students of color from developing countries were more prone to mistreatment compared to White students from Canada, Australia, and European countries (Lee, 2010; Lee & Opio, in press).

This study extends the concept of neoracism in academia to examine the extent to which postdocs in various regions of the world encounter different expectations and experiences based on their region of origin. While previous research uncovering neoracism has focused on stereotypes and mistreatment from the host society, this research examines ways that neoracism becomes institutionalized as postdocs seek professional attainment despite unequal working conditions. Neoracism is an appropriate lens for this research, as it helps explain the accepted unequal power dynamics that might occur among U.S. and U.K. faculty and their international postdocs.

Methodology

This study first sought to understand the global market of postdocs from the perspectives of postdocs and their employers. Following this line of inquiry, the study then focused on ways that neoracism might surface in addressing the following research questions: What are faculty expectations of international postdocs? What are the resultant experiences among international postdocs?

The research sites for this study were four public research universities, two in the United States and two in the United Kingdom. The research sample is comprised of forty-nine in-depth, semistructured participant interviews. Participants were drawn from life sciences and engineering departments as well as from administrative units at each of the four university sites. International higher education research cannot be abstracted from the places and spaces in which the research is conducted (Maldonado-Maldonado & Cantwell, 2008) and should examine the interaction between global processes and local outcomes (Arnove, 2003). The site and sample of the research were integral to the framing of the research problem, based on the way the research was conducted and the analysis of those data gathered for the study.

Research Sites

The sites of the research project include the higher education systems in the United States and the United Kingdom as well as the specific institutions included in the study. As we have already discussed, both nations are among

TABLE 2 *University characteristics*

	Country	Total student enrollment, 2007	Graduate student enrollment, 2007	International student enrollment, 2007	Total number of faculty members, 2007/8
Mid-Atlantic University	U.S.	25,813	10,040	3,484	1,597
Northern University	U.K.	21,285	4,942	6,699	2,505
South Coast University	U.K.	21,472	6,599	4,230	2,168
Southwest University	U.S.	37,217	8,147	2,261	1,705

Sources: Institutional records.

the most well-developed and prestigious higher education systems in the world, and American and British universities attract large numbers of international scholars (Altbach, 2004; Marginson, 2007). Both the United States and the United Kingdom have differentiated higher education systems with many institution types. In both countries, postdocs are concentrated in research universities. Unlike the United States, the United Kingdom does not have a well-developed and prestigious private higher education sector. In fact, all research universities are autonomous, publically funded institutions.

Research Sites: Participating Institutions

The study includes participants affiliated with four universities: Southwest University (SWU) and Mid-Atlantic University (MAU) in the United States and South Coast University (SCU) and Northern University (NU) in the United Kingdom (all university names are pseudonyms). All four universities are major public research universities, though none is a household name worldwide. Both U.S. universities are members of the American Association of Universities, a group of elite research institutions in the United States and Canada, and both of the U.K. universities are members of the Russell Group, a group of the top-twenty universities in the United Kingdom based on research funding. These universities were selected for a number of reasons. First, and most importantly, they represent typical research universities with numerous colleges, schools, and departments; extensive research facilities; and large student bodies, faculties, and research staff. Yet none are among the most prestigious institutions in these countries. Second, all four universities have large and active research programs in life sciences and engineering fields, ensuring sufficient opportunity to identify eligible participants. Third, each of these universities offered us access to their faculty, postdocs, and facilities, ensuring that it would be possible to conduct research on the respective campuses. Table 2 summarizes important characteristics for each of the universities included in the study.

Sample

The sample consists of a total of forty-nine participants from the four universities described above. Participants included twenty-two postdocs, twenty-two faculty members who had experience supervising at least one international postdoc, and five administrators involved with either postdoctoral or international policies at one of the participating universities. Table 3 summarizes the breakdown of participants by country, university, position, discipline, and gender. Appendix A lists all participants by their affiliation, field, status, and country of origin. Pseudonyms are used when referencing individual participants.

We included participants based on their direct personal insights into the research questions. Faculty who had supervised international postdocs offered insights about how and why they hired postdocs from abroad as well as what these postdocs did under their supervision. International postdocs explained how and why they chose to work as a postdoc abroad, the procedure by which they found their jobs, the nature of their work and personal experiences as postdocs, as well as their future intentions. We sampled university administrators to triangulate data gathered through postdoc and faculty interviews and to provide information on official university policies related to international postdoctoral employment.

A number of the participants were able to address the research questions from multiple perspectives, giving additional depth to their interviews. Among the five university administrators who participated in the study, three held PhD's in STEM fields and had themselves worked as postdocs (one internationally) before becoming administrators. Four of the postdocs who were interviewed had worked as postdocs in multiple countries—two were international postdocs in both the United States and United Kingdom—and were therefore able to compare the hiring process and work experience across borders. Finally, nearly every faculty member interviewed had worked as a postdoc prior to becoming an academic, and eight had worked as postdocs abroad.

Data Analysis

The study involved a two-part sequential process of data analysis following the methods outlined by Rubin and Rubin (2005). The raw data (interview transcripts) were coded by labeling part of each transcript with deductive (a priori) and inductive (developed through the text) coding. This coding scheme then allowed for organizing the data by code rather than by interview and for a comparative analysis in order to develop themes. The themes that emerged through this analysis are the basic elements of the research findings.

Coding was a progressive process, beginning with many small codes that were eventually clustered into major themes (Rubin & Rubin, 2005). In order to promote comparison, major theme construction was intended as a progressive process, beginning with organizing coded data into discrete categories by country, institution, discipline, and position (postdoc or faculty member). We

TABLE 3 *Participant demographics*

<i>Category</i>		<i>Count</i>
Participants by discipline	Life Sciences	21
	Engineering	17
Participants by university	SWU	17
	NU	13
	MAU	11
	SCU	8
Participants by position	Faculty	22
	Postdocs	22
	Administration	5
Postdocs by country of employment	United Kingdom	12
	United States	10
Postdocs by country of origin	China	6
	India	4
	France	2
	Australia	1
	Denmark	1
	Ecuador	1
	Korea	1
	Netherlands	1
	Nigeria	1
	Spain	1
	Slovakia	1
	Taiwan	1
	Uruguay	1
Faculty by country of employment	United States	15
	United Kingdom	7
Faculty by country of origin	United States	7
	United Kingdom	6
	India	2
	Netherlands	2
	Argentina	1
	France	1
	Hungary	1
	Poland	1
	Turkey	1

reviewed codes across categories, comparing the differences and similarities in coded data between and within categories. We gave particular consideration to stories because they often show explicit connections between coded data that are not immediately apparent (Rubin & Rubin, 2005). We developed major themes in order to answer the research questions posed above and serve as the basic building blocks for the findings and the implications of the study.

Findings

Global Market

International postdoctoral employment often occurs through solicitation in an international academic labor market. Findings from this study show solicitation for postdocs occurs within a global scientific space of flows, which can be understood as an academic global market in that it is a transnational space in which the buyers of postdoc labor meet sellers of postdoc labor through a marketplace-like exchange (Cantwell, 2009; Marginson, 2007). Altbach (1998) has described this market as uneven and hierarchical. Universities in the United States are at the pinnacle of the academic global market. This is similarly the case with postdoctoral labor. By and large, postdocs in the sample saw the United States at the center of the global scientific market. For example, an eastern European postdoc, when asked why she chose to work in the United States, explained, “I don’t know [exactly why I came to the United States]. It is tradition in Europe. So if you go somewhere in Europe, it is not so good as if you go to the USA” (Dr. Nesved/life sciences postdoc/SWU). Even when European postdocs working in the United Kingdom expressed not wanting to work in the United States, they cited personal and political reasons (e.g., wanting to remain close to family or disagreeing with U.S. foreign policy) rather than research or career reasons to explain their choice.

The extent to which the market for postdocs is truly global requires further scrutiny. The global scientific space of flows is defined by its boundaries, meaning that some people, areas, and activities are outside this space (Cantwell, 2009). Thus, the global market, at least for postdoctoral labor, is not only uneven but also exclusive. This geographical exclusivity plays out when faculty recruit postdocs through global solicitation procedures. Several of the faculty in the sample report that they only hire postdocs from “major” or “big” scientific countries. Some stated this preference explicitly. For example, with the obvious additions of China and India, Professor Peters’s definition of what constitutes the “major scientific countries” represents a general consensus among faculty members who participated in this study:

Well, members of the EU, the Nordic countries, North America, Japan, and these days, parts of East-Asia. You know, Singapore, South Korea, and Australia. (Professor Peters/life sciences/NU).

Dr. Raja, an engineering professor from India who went to graduate school in the United States before becoming a faculty member at MAU, explained his belief in the superiority of U.S. graduate education:

So, you are really looking to get people who will get started asap. Especially from that standpoint, you want people who are extremely independent and who can do their work with minimal guidance and furthermore, be creative in that process. So, all that . . . I think a research education in the U.S. is greatly beneficial for all those things . . . Graduate education for India or China . . . I'm never 100 percent sure how independent the person was . . . The top-notch candidates do seem to be going abroad for their PhD's so somebody who actually stays on in their own institution in Asia, especially Asia, one would ask, "Why did that person not explore opportunities abroad?"

These remarks suggest that while Asian countries are perceived to be major players in the scientific space of flows, they tend to be viewed as training grounds to send their "top-notch candidates" to Western Europe and North America. An Asian graduate student who chooses to study in his or her home country is scrutinized as being less competent than one who studied outside Asia.

The postdocs in our study who came to the United States and the United Kingdom from abroad generally understood the prestige of research institutions and the position of the universities in national and global rankings. However, these international postdocs did not always have a grasp of their market position within local academic labor structures. In some cases, their positions within lab work groups appeared to limit their career prospects. Faculty supervisors believed that many international postdocs would not become faculty members and that there is a relationship between the types of work postdocs do within laboratory work groups and future career prospects. Professor King, an engineer at MAU, said that when he was a postdoc, it was expected that all postdocs would become faculty members, but in reflecting on the international postdocs he now supervises, he indicated that this is no longer the case. According to him, the likelihood of a postdoc becoming a faculty member "depends on the type of person that postdoc is." Another professor indicated that being "broad-ranging in thought" was an attribute needed to become a faculty member (Dr. Tate/engineering/NU). Postdocs who were "broad-ranging in thought" were given autonomy and publication opportunities, while other postdocs did technician-like work. Superlatives like "broad-ranging in thought" and "creative," indicating autonomy and opportunity, tended to be applied to North American and European postdocs, while "hard working" and "dedicated" were typically used to describe postdocs from developing countries.

Global Supply of Postdocs

Growth in higher education and science capacity in Asia and other places around the world has increased the supply of candidates for postdoctoral

positions in universities in the United States and United Kingdom. Among the twenty-two faculty members who participated in this study, the share of postdocs they supervised who came from abroad ranged from 25 percent to 100 percent. All reported that when they advertise new postdoc positions, the majority of all applications come from abroad, particularly from China and India. While there are no data available on the national origins of all postdoctoral applications, the experiences of the faculty members who participated in this study suggest that it is not uncommon for a very high share of applications to come from abroad. For example, Dr. Cruz, an associate professor at SWU, estimated that something “like 95 percent [of postdoc applications] that have come have been foreign-born applicants.” The proportion of international applicants Dr. Cruz reported receiving is higher than those received by other faculty members, but it was not uncommon for faculty members to report that 60 percent or 70 percent of all postdoc applicants came from abroad. In fact, eight of the twenty-two sampled faculty members reported receiving unsolicited inquiries about postdoc opportunities from international researchers. Although these unprompted inquiries rarely lead to job offers, they help demonstrate the magnitude of global postdoc supply. According to Professor Peters, university Web sites are the portals for this global supply:

The university Web site is constantly accessed by an enormous number of people looking for posts, and I dare say that I get at least one unsolicited request for a postdoctoral post a week . . . but remember the vast majority of those will be from one of two countries, China or India. (Professor Peters/life sciences/NU).

Given the large supply and high competition for limited postdoc positions in the United States and the United Kingdom, as well as the high number of skilled migrants and the documented high stay rates of doctoral students (Finn, 2001; Rollason, 2002; Schiff, 2005), it is reasonable to speculate that hired postdocs from abroad tend to remain in their host counties in contingent positions and often never return to secure employment in their home countries. Participants tended to support this assumption. When asked, “When you hire postdocs from abroad, do you see them as future faculty members?” Professor Crookshanks (life sciences/SWU) responded:

No, typically no. Not initially. The operating assumption when we hire them is that they are going to go back. Now the reality is that many don’t go back . . . You know, just looking around the department, the students from the third world tend to stay because the opportunities are better here. That, of course, is counterproductive to the reason that their government encouraged them to come here in the first place.

As acknowledged by Dr. Crookshanks, many postdocs, particularly from developing countries, remain as postdocs indefinitely, despite initial intentions for further professional advancement.

Influence of Race and Nationality

Underlying the supply-and-demand explanation for why there is a growing presence of international postdocs in the research labs at universities in the United States and the United Kingdom was an assumption that exogenous forces shape the labor market for postdocs. To an extent, evidence suggests that this is true. Scientific growth around the world, especially in Asia, has generated an enormous supply of postdocs from abroad (NRC, 2005). Yet, when given the choice between domestic and international candidates, many faculty members chose to hire the candidate from abroad. The reasons why faculty members seemed to be making these choices were not immediately apparent. In both the United States and the United Kingdom it takes less time and resources to hire local candidates. Additionally, in both countries, there are limited opportunities to find funds outside of normal research grants in the form of training grants to pay for international postdocs' wages. When pressed on whether there is a difference in the work between domestic and international postdocs, most faculty members indicated that they see no differences or that they do not have sufficient data to make a determination one way or another. However, five members admitted that international postdocs are seen to be "better workers."

The comments of two life scientists who gave particularly frank interviews are useful to demonstrate this point. When asked about the differences between U.K. and European postdocs and those from outside the European Union, Professor Peters (life sciences/NU) indicated that he preferred to hire non-EU postdocs because he felt they have an "adventurousness" that is useful in the lab. He went on to say that Chinese postdocs were the best workers, explaining, "Chinese work their socks off, they are constantly, all the time working hard." Professor Crookshanks (life sciences/SWU) offered a similar impression. His "sense" was that "these foreign postdocs and graduate students tend to think being a scientist is a privilege and many of the American kids tend to view it as a right. And what that translated to is the commitment and the degree of effort." In contrast, Dr. Roth, an associate professor of life sciences at SWU, explained that he hired the most qualified candidate, "no matter where they come from," but preferred to hire U.S. nationals because "you don't have to deal with visa paperwork."

Findings further revealed that the particular tasks in which the postdocs were engaged were connected to culturally specific stereotypes. This is most apparent in the case of postdocs from Asia. Seven faculty members in this study offered their opinion that Asians are quiet people who work hard but who may not have strong ambitions for career advancement. Because of this assumption, which misplaced cultural stereotype for individual personality and preferences, postdocs from Asia were rarely given the opportunity to engage in the types of activities that would help them advance toward faculty positions.

Six postdocs from Asia whom we interviewed expressed the belief that their work was conditioned by their race and nationality. Dr. Kim, a postdoc in the life sciences at MAU, said, “I think many American PIs [principal investigators] hire us [Asian postdocs] because they expect us to be quiet people who like to work hard.” All of this suggests that the increasing numbers of international postdocs, especially from Asia, are not just related to external supply and demand conditions but are embedded within the global capitalist labor market through the organizational structures of academic research. If Asia’s position in the global economy has become the “workshop for the world,” as it is often quipped (e.g., Williams, 2009), then Asian postdocs are the “quiet” or “invisible” producers of Western science. Furthermore, faculty members may also find Asian postdocs appealing because they have less pressure to train them to become faculty members. This is related to their temporary visa status (which is shared with other international postdocs), limited English skills, and the assumption that Asians are nonstriving people who do not demand advancement opportunities. Dr. Patel, an Indian-born science administrator at SWU and a former international postdoc, explained:

I think what I have seen with Chinese postdocs, for them just getting out of China is a big thing . . . I think they come here with very realistic notions. Very few of them expect to make faculties. They are willing to remain postdocs for years. One of our technicians was Chinese and she was an MD from China and is a tech here. And she is willing to do that until she retires. So I think the Chinese motivation is a little different.

As expressed by Dr. Patel, Chinese postdocs in the United States are grateful enough to be “getting out of China” and do not aspire to advance beyond “technician” work.

About half of the interviewed faculty members loosely grouped postdocs based on their countries of origin, but their pecking order was inconsistent. In contrast to Dr. Patel, Dr. Cruz (associate professor/life sciences/SWU) explained that Indian institutions emphasized the technical over the theoretical and Indian students were thus less capable of becoming faculty, whereas Chinese students have more theoretical training:

The Indian enterprise is really more on biosciences applications as opposed to strict or pure research. So those people tend to have more of a lot of technical training but don’t have the kind of theoretical training that, for example, a Chinese student coming from the Chinese Academy of Sciences would.

He then indicated his high regard for Western scientists: “I know, for example, England, France, . . . Germany would be very good places. Australia has a good research enterprise, and so I think those would be good source[s] of postdocs as well.” He then admitted, “I would say, when I hire, actually, I am kind of biased a little bit towards China and Japan because I am a little more familiar with their research enterprises.” While Dr. Cruz perceived Europeans and Australians as better trained in theory than Asians were, and thus more

prepared to become faculty, he preferred to hire East Asians for their technical training. His and previous comments indicate a possible two-tiered system of postdocs—the top tier consisting of North Americans, Europeans, and Australians as future faculty and the bottom tier consisting of Asians as indefinite temporary-status technicians.

Dr. Patel (administrator/SWU) indicated a more detailed hierarchical view of countries, which contradicted Dr. Cruz's hierarchy, starting with the United States, then India, then China. She explained why Indian postdocs were more likely to become faculty over Chinese postdocs:

I think the Indians have the advantage of knowing the language, and that gives them the ambition to aim higher. And I think over the past thirty to forty years, you can see that Indians have really established themselves as faculty [members]; they have their labs. Still, it is not as high as Americans, of course. But I think especially in the field of computer sciences, there are more faculty [members]. Not in the biological sciences, we have a couple of, you know, we have a department head who is an Indian here, and so they defiantly move up. Indians do move up eventually. I don't know of any Indian who has remained a postdoc all of their life.

While greater fluency in the English language is one major reason that Indians are more likely to secure faculty positions over the Chinese, according to Dr. Patel, Indians are nevertheless less successful than Americans. Her explanation suggests other forces beyond language are at play, which are detailed in the next section.

Unequal Working Conditions and Experiences Among Postdocs

Our study's findings uncovered perceived unequal working conditions that were linked to postdocs' international status. For instance, Dr. Song, an engineer from China working as a postdoc at NU, believed that her British supervisor's "attitude" toward her differed from his attitude toward a European postdoc she worked with:

My colleague come into the office probably not often, kind of work at home and that is acceptable. I am not sure if they would say anything, but I feel that if I do the same thing, then probably I would be in trouble (Dr. Song/engineering postdoc/NU).

Dr. Song's feelings are not uncommon. International postdocs, especially those from Asia, reported feeling that they are expected to spend much more time working and are afforded fewer liberties to meet family and social obligations. This expectation may have to do with stereotypes of Asian culture held by British and American faculty. Around half of the faculty members in this study indicated a belief that Asians are industrious and seemed to expect Asian postdocs to act this way. Dr. Song, for example, is a highly productive engineer who enjoys doing research, but she believes that she cannot afford to take any time off. She reported that she is expected to work all day every day, or her

job may be in jeopardy. There is no evidence to suggest that she would actually be fired if she took time off, but her feelings are notable, especially in comparison to the way international postdocs from elsewhere in Europe perceive their work. Take, for example, Dr. Groot, a Dutch postdoc in the life sciences at SCU. Like Dr. Song, Dr. Groot is a productive researcher; unlike Dr. Song, Dr. Groot feels supported by his supervisor to spend one whole day each week out of the lab to meet family obligations. Again, there is no direct evidence to show that the differences in the way these two international postdocs perceive their supervisors' expectations about their work is caused by nationality. They are different people in different fields, and they have different supervisors.

Dr. Mok, an engineering postdoc at NU from China, offered an explanation as to why postdocs from abroad, and especially from Asia and other developing regions, feel differential pressures to work long hours. He said that faculty members and university staff are less familiar and comfortable with people from different cultures. As a result, postdocs from Asia "really stand out to get picked and to get promoted up. So, you know, a lot of things I cannot control in that situation." This need or expectation to stand out appears to place work pressures on postdocs from developing countries that are qualitatively different from the experiences of postdocs from Western Europe and the United States.

In fact, the way postdocs view their work is consistently different among postdocs from Europe and other parts of the world in both the United States and the United Kingdom. Postdocs from the West often describe their supervisors as "supportive" and "understanding," whereas Asian postdocs typically described their supervisors as "nice," "normal," or "average." The difference in these descriptions is that Western postdocs tended to describe their supervisors in relationship to themselves, whereas Asian postdocs and other postdocs from developing regions offered generic descriptions that did not indicate a personally supportive relationship. Indeed, while Asian postdocs accounted for the majority of the non-European postdoc sample, the experiences of Dr. Lopez from Ecuador (engineering postdoc/SWU) and Dr. Adu from Nigeria (life sciences postdoc/SCU) reveal that non-Asian postdocs from developing countries may also encounter discrimination. Dr. Lopez came to SWU with the promise of a full-time job. However, when he arrived "my boss tells me there is only money for half-time, but I am still working full time." Dr. Adu, who had worked as a postdoc in both the United States and the United Kingdom, explained that he came to the United Kingdom because his previous supervisor in the United States would not sponsor him for a visa extension, even though funds were available and he believed he had performed well. Dr. Adu speculated that this decision might have been because of his nation of origin rather than his supervisor's explanation that "a J-1 visa means only one job."

These findings are consistent with findings from a study in the United States showing that non-Western international students face more discrimination and difficulties than international students from the West (Lee & Rice, 2007)

as well as data from a U.S. postdoc survey that showed international postdocs spent more hours working each week compared to domestic postdocs (Davis 2005). According to Dr. Patel (administrator/SWU):

I think, as a rule, some PIs like to hire international postdocs for a couple of reasons. I think international postdocs are just used to longer work hours and just are motivated to work harder than most American postdocs. Don't get me wrong. I know American postdocs who slog their butts off, but I mean, I know some Chinese postdocs who literally spend day and night in the lab. And it is not because the PI demands it; it is because they want to be there. But then I think that depends on the nationality, and I think there is a certain amount of fear in the international postdocs where, nobody has put in there, but it is the whole immigration setup. They need do a little bit extra to justify them staying there and continuing their work.

Chinese and other Asian postdocs are characterized as hardworking researchers who are at least partly motivated by a fear of losing their jobs. Based on their visa status, if they lose their position, they will be deported back to their home country.

These findings also show that international status is more than a legal category. Being international in some cases is also defined by a feeling of alienation, albeit to varying degrees. In our study, postdocs from outside Europe tended to feel less comfortable in the United Kingdom than did European postdocs, and postdocs from northern Europe seemed somewhat more comfortable in the United Kingdom than postdocs from southern Europe. For example, Dr. Janson, a life sciences postdoc at SCU from Denmark, described being in the United Kingdom as being "almost like home," whereas Dr. Mendoza, an engineering postdoc at NU from Spain, always felt "a little out of place."

In part, the alienation expressed by international postdocs, which distinguishes them as international, is related to differences in language and culture. Most often, postdocs from abroad do not speak native English, including postdocs from elsewhere in Europe. For Dr. Richoux, being a native French speaker meant more than not understanding English words from time to time; it meant approaching research in a fundamentally different way. As he explained, "there is also a different way of thinking about research, but this has to do with the difference of writing papers in French and in English."

In both the United States and the United Kingdom, however, postdocs from Asia clearly experienced the greatest sense of alienation and discrimination and the most pressure to perform. Dr. Wang (life sciences postdoc/SWU) succinctly summarized this key finding: "As a group we [Asian postdocs] are invisible, but we do everything in the lab."

Discussion

Postdocs are a significant but understudied population in the global academic labor market. While they are traditionally understood as PhD's in training for

a faculty career, the political economy largely has reshaped their work from apprentices to temporary employees (Cantwell, 2009). Some postdocs manage to advance to the faculty profession; however, the large supply of PhD's compared to the few faculty positions available have resulted in many remaining as postdocs indefinitely. Postdoctoral expansion as a result of PhD oversupply has long been understood (Zumeta, 1985). However, the contemporary global economy has further shaped academic flows with postdocs from Asia seeking positions in North America and Western Europe. Forced mobility based on temporary contracts and pay differentials (Ackers, 2008, p. 415) will likely sustain global postdoc flows. Moreover, in the current downward economic climate, universities may likely increase their reliance on postdoctoral labor for relatively inexpensive research, often subsidized by external grants, in place of further long-term investment in faculty positions. Continued shifts away from permanent tenure lines to contingent academic labor may extend the conditions in which postdocs from abroad, especially those from developing countries, are exploited.

Academic capitalism explains how current unequal structures of opportunity are maintained. The faculty interviewed in this study acknowledged that the postdocs they hired may never become faculty but were "lucky" to even be employed in the United States or the United Kingdom compared to staying in their home country. Meanwhile, the host institutions benefit from international researchers' scientific production without having to provide professional security (Stephan & Levin, 2001). Insecure working conditions are maintained, given the large surplus of PhD's from developing countries seeking employment in the United States and the United Kingdom. Thus, postdoctoral labor is changing as hiring decisions and working conditions are shaped more by the global economy and less by educational growth and professional mobility.

Our study of faculty and postdocs in the United States and the United Kingdom also revealed that neoracism helps explain the uneven expectations and experiences of postdocs, depending on their country of origin, which further explains the larger pattern of global flows. The flow of postdoc labor is shaped not only by economic restraints but also by the supply and demand forces of academic labor markets that determine employment opportunities and experiences. Many hiring faculty members in this study seemed to attach stereotypes about countries and cultures to individual postdocs, which further shaped their postdocs' professional opportunities and working conditions. Findings indicate that Asians in particular, in contrast to Europeans and Americans, are perceived as being hard workers and good technicians but as lacking the more sophisticated theoretical understandings to become faculty. Such cultural stereotypes may benefit Asians in being initially hired as postdocs, but the tasks that they are often assigned tend not to prepare them for faculty careers.

Whereas Lee and Rice (2007) examine neoracism from the perspective of the international students and their self-reported experiences (see also Lee,

2010; Lee & Opio, in press; Lee & Rice, 2007), this research extends neoracism theory by examining the larger structures of the job market and varying degrees of opportunity, depending on one's country of origin as reported by faculty and postdocs. Like previous neoracism research, the findings from this study confirm how individuals concede to cultural stereotypes and discrimination in pursuit of individual self-interest, whether it is educational opportunities or career pursuits. These individuals, based on our current and past research, were often fully aware of the discrimination placed on them but rarely felt empowered enough to challenge any mistreatment, out of fear of retaliation or deportation. In many cases, the interview process was the first time they reported perceptions of discrimination to outsiders.

A number of implications for future research emerge from this study. First, the postdoctorate warrants further study within the field of higher education. Understanding both the structure of the postdoctorate as well as the experiences of postdocs in contemporary research universities is needed to more fully address the academic profession and changing organizational patterns. Given that postdoctoral positions are quickly outpacing faculty positions, the professorial market is becoming increasingly competitive, and more research is needed to identify patterns in the factors associated with landing faculty jobs. Attention has been given to the increase in adjunct instructors (Schuster & Finkelstein, 2006), but few have examined shifting patterns in research work, including the increasing role of postdocs, which further suggests a segmentation of academic labor. Moreover, we found that these shifting patterns do not affect all equally and that postdocs from abroad, especially those from Asia and other developing regions of the world may be particularly vulnerable to exploitation. Related research on the experiences of individuals who remain postdocs indefinitely, moving from one short-term funded project to another, is warranted to better understand new patterns of academic labor by various groups.

Second, the relationship between identity and academic work remains salient. Research should continue to explore how race, gender, and nationality affect academic employment and career opportunities. This study highlights the importance of examining how structures of opportunity are conditioned by the interaction among patterns of academic capitalism, globalization, and structures of national and racial inequality. Employers' differing perceptions and expectations of postdocs from China, for example, were notably unlike their views of postdocs from the United States. Neoracist assumptions tie directly to opportunities for career advancement. Future research should examine our assertions in other academic fields and contexts. Moreover, research should consider not only how identity affects access to universities and academic jobs but how identity affects the ways in which various groups are incorporated into academic work.

To that end, a final implication for research emerging from this study is the importance of connecting systemic and organizational changes with indi-

vidual experiences and outcomes. We found, for example, that academic capitalism has provided initial employment opportunities for Asian postdocs in the United States and the United Kingdom by moving to a contingent, global academic labor mode but that these opportunities are potentially exploitative and may inhibit career success. Meanwhile, the host countries benefit from a continuous inflow of academic talent from abroad. Additional research should examine how academic capitalism may be related to unequal opportunity structures for other groups. Areas for further inquiry might include staffing in university settings and nonacademic contexts that tend to hire talent from abroad. Given the increasing international mobility of workers, this research calls for critical inquiry on possible unequal patterns of opportunity and advancement.

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APPENDIX A *Participants by affiliation and country of origin*

<i>Pseudonym</i>	<i>University</i>	<i>Field</i>	<i>Position</i>	<i>Country of origin</i>
Dr. Adu	SCU	L.S.	P.D.	Nigeria
Dr. Allubie	MAU	Eng.	P.D.	France
Dr. Bagwhati	MAU	Eng.	P.D.	India
Dr. Bradford	NU	n/a	Admin.	U.K.
Dr. Chang	MAU	L.S.	Fac.	U.S.
Dr. Crookshanks	SWU	L.S.	Fac.	U.S.
Dr. Cruz	SWU	L.S.	Fac.	U.S.
Dr. Daniels	NU	L.S.	Fac.	U.K.
Dr. Davies	NU	L.S.	Fac.	U.K.
Dr. Diaz	SWU	L.S.	Fac.	Argentina
Dr. Duda	SWU	Eng.	Fac.	Poland
Dr. Galatasaray	SWU	Eng.	Fac.	Turkey
Dr. Groot	SCU	L.S.	P.D.	Netherlands
Dr. Grosky	SWU	Eng.	Fac.	Hungary
Dr. Gupta	SWU	L.S.	P.D.	India
Mrs. Handel	MAU	n/a	Admin.	U.S.
Dr. Hoff	SCU	L.S.	Fac.	Netherlands
Dr. Jagtiani	MAU	Eng.	P.D.	India
Dr. Jamison	SCU	L.S.	Fac.	U.K.
Dr. Jana	SCU	L.S.	P.D.	India
Dr. Jansen	SCU	L.S.	P.D.	Denmark
Dr. Jones	NU	L.S.	P.D.	Australia
Dr. Kim	MAU	L.S.	P.D.	Taiwan
Dr. King	MAU	Eng.	Fac.	U.S.
Dr. Kingsly	SWU	n/a	Admin.	U.S.
Dr. Lopez	SWU	Eng.	P.D.	Ecuador
Dr. Marsh	MAU	L.S.	Fac.	U.S.
Dr. Mendoza	NU	Eng.	P.D.	Spain
Dr. Merot	SWU	L.S.	Fac.	France
Dr. Mok	NU	Eng.	P.D.	China
Dr. Nesved	SWU	L.S.	P.D.	Slovakia
Dr. Patel	SWU	n/a	Admin.	India
Dr. Peters	NU	L.S.	Fac.	U.K.
Dr. Raja	MAU	Eng.	Fac.	India
Dr. Ren	NU	L.S.	P.D.	China
Dr. Richards	MAU	L.S.	Fac.	U.S.
Dr. Richoux	NU	Eng.	P.D.	France
Dr. Roth	SWU	L.S.	Fac.	U.S.
Dr. Roy	SWU	L.S.	Fac.	Netherlands
Dr. Ruiz	SCU	Eng.	P.D.	Uruguay

<i>Pseudonym</i>	<i>University</i>	<i>Field</i>	<i>Position</i>	<i>Country of origin</i>
Dr. Shimran	NU	Eng.	Fac.	India
Dr. Smith	NU	n/a	Admin.	U.K.
Dr. Smythe	MAU	L.S.	Fac.	U.K.
Dr. Song	NU	Eng.	P.D.	China
Dr. Tate	NU	Eng.	Fac.	U.K.
Dr. Wang	SWU	L.S.	P.D.	China
Dr. Wu	SWU	Eng.	P.D.	China
Dr. Young	SCU	L.S.	P.D.	Korea
Dr. Zhang	SWU	L.S.	P.D.	China

Note: Eng: Engineering; L.S.: Life Sciences; P.D.: Postdoc.

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