SCIENCE & DIPLOMACY

A quarterly publication from the AAAS Center for Science Diplomacy

Grażyna Żebrowska and Marek Konarzewski, "Choosing between the United States and the EU: Emigration of Polish Researchers, 1996-2012," *Science & Diplomacy*, Vol. 3, No. 1 (March 2014*).
http://www.sciencediplomacy.org/article/2014/choosing-between-united-states-and-eu.

*The complete issue will be posted in March 2014.

Choosing between the United States and the EU: Emigration of Polish Researchers, 1996-2012

Grażyna Żebrowska and Marek Konarzewski

FOR over a century the United States has been the destination of choice for Polish emigrants from all walks of life, a testament to the successful application of America's soft power. This emigration particularly intensified among academics and researchers after World War II, when many found it impossible to pursue their careers in their home country under a politically oppressive system and state controlled economy. The process of emigration of Polish researchers became an exodus during the Martial Law imposed in Poland in the 1980s, when Polish research institutions lost up to 44 percent of their staff.[1] The collapse of communism in 1989, economic reforms towards a free market economy, and finally, Poland's accession to the European Union in 2004 have all changed the economic and social conditions that had prompted Polish researchers to emigrate. At the same time, particularly starting in the new century, research and immigration conditions have become relatively less favorable in the United States.[2]

However, surprisingly, there is very little known about the effect of those factors on the magnitude, dynamics, and significance of the flux of Polish researchers to

Grażyna Żebrowska is the science and technology affairs advisor at the Embassy of the Republic of Poland in Washington, DC.

Marek Konarzewski is a professor in the Department of Animal Ecology at the Institute of Biology, University of Bialystok, and former science and technology minister-counselor at the Embassy of the Republic of Poland in Washington, DC (2008-2013).

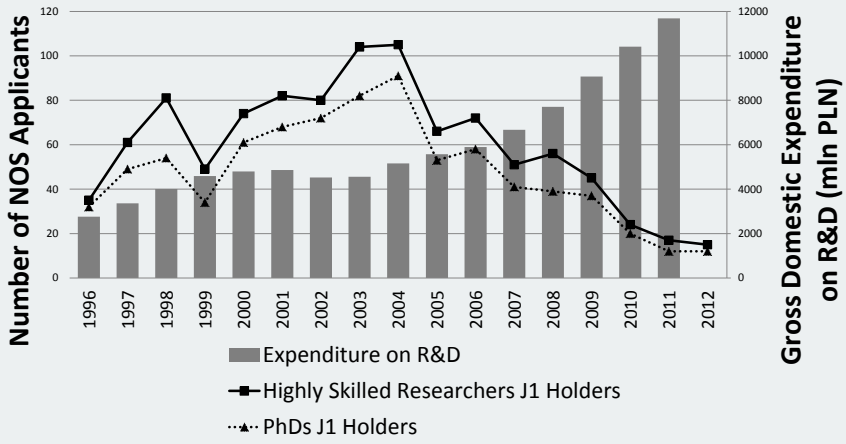
the United States vis-à-vis emigration to EU member states. Although in recent decades the problem of "brain drain" from Poland has attracted a lot of attention, a great majority of studies have concentrated on the migration of researchers to Western Europe as a consequence of Polish accession to the European Union.[3] Virtually no studies attempted to quantify and elaborate on the emigration of highly skilled Polish researchers to the United States. The Polish diaspora in the United States is heavily involved in scientific cooperation between the countries. More broadly, the Polish-U.S. political relationship has certainly been strengthened by the historical ties between their communities built on migration. Polish citizens have a favorable public opinion of the United States. Although this measure has declined by about 10 percent in the last twenty years, it is still among the highest in Europe at 67 percent.[4]

To shed light on the significance and magnitude of the recent transatlantic emigration of Polish researchers, we have analyzed the data related to the best and brightest researchers of Polish nationality, the holders of PhDs, MDs, and Masters of Science (MS) degrees already affiliated with American academic and R&D institutions. We then compared the dynamics of migration to the United States with the data on migration to EU countries gleaned from literature. We also attempted to evaluate the impact of "brain drain" with concrete examples of Polish research institutions being the leading source of immigrants to the United States. Likewise, we also attempted to identify the main American recipient institutions and reasons for why they attracted disproportionate numbers of science immigrants. Finally, we have discussed our results in the context of the ongoing debate on the significance of "brain drain" versus brain circulation, the mobility of Polish researchers within the EU versus immigration to the United States, and implications for U.S. soft power.

In this paper, emigration (or the "brain drain") of Highly Skilled Researchers (HSR) is understood in the narrow sense, i.e., as permanent immigration of holders of PhDs, MDs, and MS degrees affiliated with American academic and R&D institutions. We used yearly accounts of applications for the "No Objection Statement" (NOS) filed to the Embassy of the Republic of Poland in Washington, DC, from 1996 to 2012 as a quantitative metric of immigration to the United States. The NOS is a legal certificate issued by the embassy, and is required by the U.S. Department of State, from researchers seeking permanent residency in the United States.[5] Filing such an application is therefore a clear indication of an individual researcher to settle in the United States. Furthermore, the application was accompanied by a letter from the host institution intending to hire the researcher. The applications were subsequently reviewed by the U.S. Department of State, which declined only a few cases per year. For all these reasons, the number of filed NOSs is the most relevant, informative, and accurate source of information on permanent immigration of HSRs to the United States.

From 1996 to 2012 (the period for which data were available) the Embassy of Poland processed a total of 1,017 applications filed by HSRs. Between 1996 and

Figure 1: Migration of Polish Researchers to the United States



Graph based on numbers of NOS applications. Data on funding from Central Statistical Office (GUS).

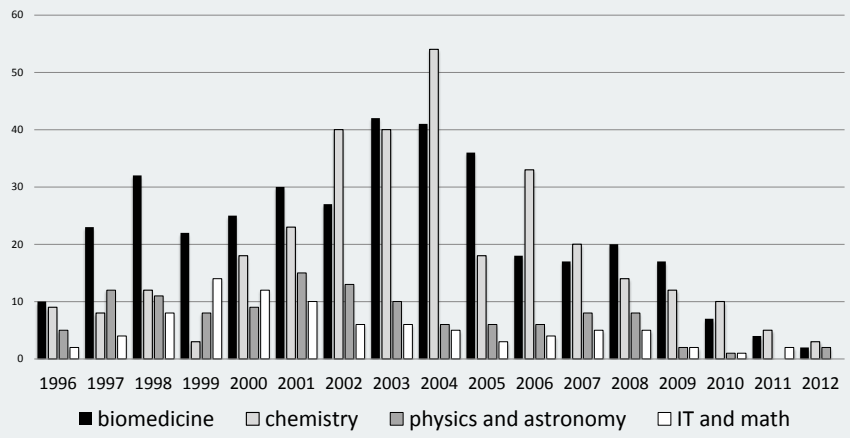
2004 (the year of Polish accession to the EU) the numbers grew steadily from thirty to ninety applications per year, as shown in Figure 1.

After 2004, there was a conspicuous decline in applications, which in most recent years has decreased to ten per year, and remained steady. A great majority of emigrants held PhDs (815), followed by MS degrees (152) and MDs (131). As shown in Figure 2, they chiefly represented biomedicine (373), chemistry (322), physics and astronomy (122), and information technology and mathematics (89). Those numbers reflect the output of PhD programs in Poland, particularly in newly emerging fields such as molecular biology. The average age of emigrants was thirty-three, which indicates that the majority of them were at the early stages of their scientific careers, in most cases, right after completion of postdoctoral training.

To put the numbers of emigrating researchers in the context of Polish academia, we gathered data on the number of PhD titles awarded by leading Polish research institutions representing chemistry, physics, and biomedicine in the years of the peak emigration (2000-2004).

These were the home institutions of a disproportionate number of researchers settling in the United States. During this period, the highest number of emigrants originated from Polish universities (approximately 40 percent) and the institutes of the Polish Academy of Sciences (PAS, approximately 30 percent), which together constituted the bulk of emigrating researchers. Among the prime institutes of PAS, the highest number of researchers (twelve) emigrated from the Institute of Bioorganic Chemistry, whereas the number of PhDs awarded by this institute between 2000 and 2004 was thirty. The second highest number of emigrants (eight)

Figure 2: Polish NOS Applicants by Field



Graph based on numbers of NOS application, missing data not included.

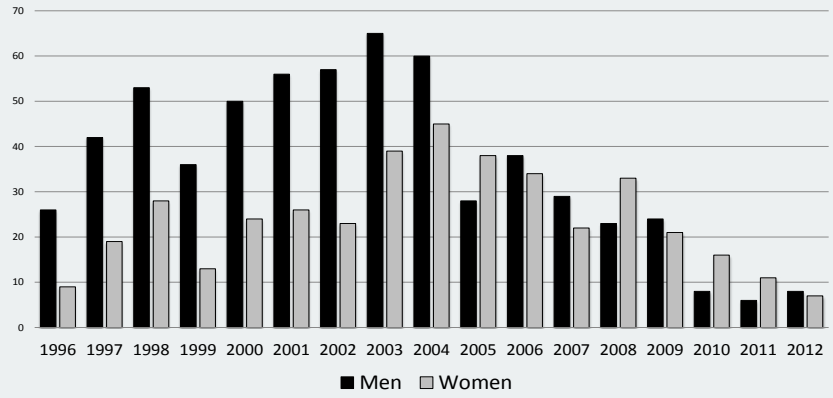
originated from the Institute of Physics, which awarded twenty-three doctorates.[6] Thus, in the period of highest research migration to the United States, it reached almost 40 percent of the PhD output of two leading Polish scientific institutions.

We have also identified a group of American research institutions that absorbed a disproportionate number of Polish research immigrants during the period under review. Among those, the highest number of young Polish researchers was employed by American universities and colleges (658 researchers), whereas national laboratories and other federally funded research institutions absorbed 75 of them. In most cases the letters of recommendation attached to NOS applications were signed by senior researchers of Polish origin or American researchers who already employed Polish scientists from the immigration waves during the 1980s. On one hand, this observation attests to an active collaboration of earlier science emigrants with their home country, on the other, it clearly indicates that such collaboration facilitates "brain drain."

Women constituted 40 percent of the total cohort of emigrants, and their share in numbers of emigrants changed over the years, as shown in Figure 3. Between 1996 and 2004 the majority of emigrants were males, which most likely reflected their higher proportion in overall numbers of doctorates awarded in Poland. For example, in 1991 men and women were recipients of 1,200 and 500 doctorates, respectively. The proportions became more even with time. In the year 2000, men and women received 2,500 and 1,700 doctorates respectively, and since 2005 gender proportions have been equal.[7] We therefore suggest that the pattern discernible in Figure 3 simply reflects the above trend.

The most striking feature of the dynamics of Polish research migration to the United States is its decline in the years following Polish accession to the EU. We suggest that two groups of factors accounted for this trend. The first group

Figure 3: Polish NOS Applicants by Gender



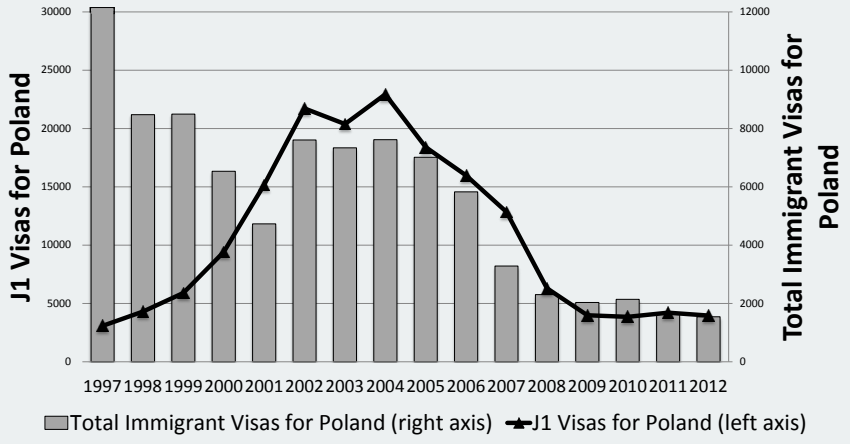
Graph based on numbers of NOS applications.

is related to rapid changes in the Polish research environment. Following EU accession, Poland significantly increased R&D funding, thereby creating more favorable conditions for those pursuing scientific careers in the home country.[8] Although Polish R&D spending is still considered insufficient by Polish researchers, it nevertheless grew 2.3 fold from Polish zlotys (PLN) 5.1 billion (approximately US$1.7 billion) in 2004 to PLN 11.7 billion (approximately US$3.9 billion) in 2011. A significant proportion of those funds has been allocated to research infrastructure, which has reached world standards in many areas of high development. After 2004, Poland has also created a transparent peer review system of funding for both basic and applied research, which promotes young researchers. For example, the National Science Center (NCN, the Polish equivalent of the U.S. National Science Foundation) by law must allocate 20 percent of its budget to fund early career research. The funding available for senior researchers has also become generous: they can now apply for individual funds of up to PLN 3 million (approximately US$1 million) in programs offered by NCN.

Furthermore, Poland has initiated homing programs aimed at bringing back young Polish researchers working abroad. Among those, the most prominent is offered by the Foundation for Polish Science (FNP).[9] Between 2006 and 2013 FNP awarded 30 percent of return grants to young Polish researchers coming from the United States. It is also worth noting that the FNP offers programs that help pregnant women and scientists and researchers raising children continue their research projects—this aid is rarely available elsewhere in the world. All these factors radically improved the prospects of pursuing research careers in Poland and were most likely the major driving force behind the reduction of numbers of Polish researchers immigrating to the United States post-2004.

The dwindling number of Polish researchers seeking permanent residence in the United States post-2004 is consistent with the overall trend of decline in the

Figure 4: Total Polish Immigration to the United States



Data from Reports of the Visa Office, U.S. Department of State.

immigration of Poles to the United States, as well as the numbers of U.S. temporary visas (chiefly J1 visas tied to training programs) issued to Polish HRSs, which is shown in Figure 4.

As some 90 percent of employment-based green card recipients were holders of temporary U.S. visas before receiving a green card,[10] a reduction of J1 visas corroborates with the low rate of settlement of Polish HRSs in the United States in recent years. A reduction in the number of J1 visas is troubling in itself, as it shows the loss of interest of young Polish researchers in pursuing collaboration with their U.S. counterparts. An important and relevant impediment is that Poland is one of the last five EU countries not included in the U.S. Visa Waiver Program, which makes initiation of such collaboration difficult.

The second group of factors contributing to a decline of immigration of Polish HRSs to the United States relates to the growing attractiveness of intra-European collaboration and mobility enjoyed by Polish researchers. The Polish research community took advantage of the opening of the EU job market, working mostly in France, Germany, and the United Kingdom (UK). For example, between 2000 and 2006, the number of Polish young researchers (below thirty-six years of age) employed in the UK rose 3.5 fold.[11] After 2000, France, Germany, and the UK became prime destinations of migrating young Polish scientists. This is also partly due to the existing strong communities of Polish researchers in those countries. In 2004 the estimated number of Polish PhD students in Germany alone was 450, exceeding the number of all Poles pursuing graduate studies in the United States. For those researchers already having strong ties with EU institutions, applying for employment within the EU was an easy decision, which most likely also contributed to the trend of declining migration to the United States seen in Figure 1.

Interestingly, this trend closely corresponds with a considerable drop in the number of U.S. visas issued to Bulgarian and Romanian HRSs after accession of their home countries to the EU in 2007. For example, from 2007 to 2009 the numbers of H and J visas issued to Bulgarian and Romanian citizens decreased by 50 percent and 80 percent, respectively,[12] which indicates that the pattern discernible from Figure 1 is not unique to Poland and may represent a more general tendency among new EU member states. In the case of Poland, researchers settling in EU countries were a minor fraction of the large cohort of Polish emigrants, which grew from less than a half a million in 2002 to nearly 1.9 million in 2007 and remains at that level to this day.

The lack of legal impediments, ease and speed of traveling within the European Union, and, last but not least, the implementation of mechanisms encouraging research mobility within the European Research Area set out in the Bologna Process and Lisbon Strategy, all contributed to a growing attractiveness of pursuing scientific careers within the EU, rather than in the United States. This is complemented by the European Commission's efforts to streamline complicated and lengthy administrative procedures for transferring social security benefits and health insurance between EU member states, which will further facilitate circulation of HRSs within Europe. In contrast, researchers seeking permanent residency in the United States are still confronted with tight quotas and conditions making it relatively difficult to obtain permanent resident status. With a stalemate blocking enactment of new U.S. immigration legislation and a reduction of federal R&D expenditures, the United States may no longer be a prime destination for immigration of the best and brightest EU researchers. As shown here, this already holds true in the case of Polish HRSs. We suggest that this is mainly because Polish scientists are less interested in seeking permanent emigration. Most of those who decide to emigrate pursue employment in EU member states.

While the ability of Poland to better retain its "brains" and encourage recirculation will clearly benefit Polish society and its economy, it is less clear whether lower emigration will have deleterious, long-term effects on S&T cooperation and the broader relationship between Poland and the United States. Can non-permanent migration make up for the loss in permanent migration? Can the circulation of students and post-doctoral researchers build the bridges and advance cooperation as effectively as a permanent diaspora? The dramatic changes in Polish permanent immigration to the United States highlight the challenges presented to one of the foundations of U.S. soft power in the twenty-first century if the United States is no longer the preeminent S&T power and the best and brightest have other opportunities in countries with lower barriers to entry.

For now, many Polish-American researchers who emigrated during the last two decades of the twentieth century maintain close scientific ties with their home country. For example, nineteen out of thirty-nine American members of the Polish Academy of Science representing natural and technical sciences (the bulk of

scientific emigrants) are Poles permanently based in the United States. The Polish scientific diaspora has greatly facilitated U.S.-Poland scientific exchange by hosting Polish researchers in their laboratories. Most recently, American researchers of Polish descent participated in meetings of the U.S.–Poland Joint Commission on Science and Technology held in 2010 and in 2013, making Poland one of the first countries to use the expertise of representatives of the science diaspora to advance bilateral S&T cooperation. For years to come, the Polish scientific diaspora in the United States will remain a great asset for transatlantic collaboration. **SD**

Endnotes

1. Janusz Hryniewicz, Bohdan Jałowiecki, and Agnieszka Mync, *Ucieczka mózgów ze szkolnictwa wyższego i nauki. Raport z badań* (Warszawa: Europejski Instytut Rozwoju Regionalnego i Lokalnego, 1992), http://www.euroreg.uw.edu.pl/pl/publikacje,ucieczka-mozgow-ze-szkolnictwa-wyzszego-i-nauki-raport-z-badan.
2. *Beyond 'Fortress America': National Security Controls on Science and Technology in a Globalized World* (Washington, DC: National Academies Press, 2009), http://www.nap.edu/catalog.php?record_id=12567.
3. Pawel Kaczmarczyk, *Highly skilled migration from Poland and other CEE countries – myth and reality* (Center for International Relations, 2006), http://pdc.ceu.hu/archive/00004819.
4. "Poland: Opinion of the United States - Do you have a favorable or unfavorable view of the U.S.?" Pew Research, Global Indicators Database, http://www.pewglobal.org/database/indicator/1/country/175.
5. Waiver of the Exchange Visitor Two-Year Home-Country Physical Presence Requirement, U.S. Department of State, http://travel.state.gov/content/visas/english/study-exchange/student/residency-waiver.html.
6. Unpublished data provided by Information Processing Institute, OPI. Ośrodek Przetwarzania Informacji – Państwowy Instytut Badawczy, http://www.opi.org.pl.
7. Dominik Batorski, Michał Bojanowski, and Dominika Czerniawska, *Analysis of Geographical and Institutional Mobility of Doctorate Holders in Poland* (Raport dla Ministerstwa Nauki i Szkolnictwa Wyższego, 2010).
8. *Science and Technology in 2011* (Poland: Central Statistical Office, February 15, 2013), http://www.stat.gov.pl/gus/5840_800_PLK_HTML.htm.
9. Homing Plus, The Foundation for Polish Science, http://www.fnp.org.pl/en/oferta/homing-plus-2/.
10. Demetrios G. Papademetriou, Doris Meissner, Marc R. Rosenblum, and Madeleine Sumption, *Aligning Temporary Immigration Visas with US Labor Market Needs: The Case for a New System of Provisional Visas* (Migration Policy Institute, July 2009), http://www.migrationpolicy.org/pubs/Provisional_visas.pdf.
11. Małgorzata Knauff et al., *Mobilność młodych polskich naukowców: Raport z badań* (Fundacja na rzecz Nauki Polskiej, 2008), http://www.fnp.org.pl/assets/raportFNP_mobilnosc.pdf.
12. Xiaochu Hu and Madeleine Sumption, *Scientists, Managers, and Tourists: The Changing Shape of European Mobility to the United States* (European Union, July 2011), http://www.migrationpolicy.org/research/european-migration-to-united-states. Table 5.

Acknowledgements

We would like to thank Paweł Kulesza, Tomasz Perkowski, Michał Pietras, and Tomasz Poprawka from the FNP and Łukasz Socha from the OPI for providing us with unique data. We also thank Milka Piszczek for helping us with editing the paper.