The Palestinian–German Science Bridge: building bridges through research and innovation

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# The Palestinian–German Science Bridge (PGSB) is a science diplomacy pilot project financed

by the German Federal Ministry of Education and Research and implemented jointly by Forschungszentrum Jülich and the Palestinian Academy for Science and Technology. Its goal, as its founder and its project coordinator discuss in this Comment, is to develop joint research and education programmes.

Despite limited possibilities and a lack of infrastructure for experi- mental research at Palestinian universities, Palestinian students have a strong basic and theoretical education and are highly motivated to suc- ceed. Forschungszentrum Jülich has state-of-the-art research facilities and is always looking to attract bright young scientists and new partners to work on its many research topics. With a lot of time and planning, the hope of combining the strengths of both sides and building a bridge to connect scientists with complimentary research interests materialized as the Palestinian–German Science Bridge (PGSB).

The PGSB aims to contribute to the development of a national science and technology infrastructure and to the development of academic programmes in the Palestinian territories by focusing on research that meets the needs and interests of the local community and by providing adequate career perspectives for highly qualified Palestinian graduates.

The short-term goals of the PGSB, which is funded from December 2016 until March 2025, are to give Palestinian students and faculty access to Jülich’s scientific infrastructure and to assist Jülich in recruit- ing motivated students from Palestinian universities, developing sustainable long-term cooperation between Jülich and Palestinian scientists and strengthening the development of graduate and research programmes at Palestinian universities. The PGSB is also growing a national and international scientific network to improve the com- petitiveness and visibility of Palestinian institutions, to streamline the use of resources in the Palestinian territories and to expand the network of partners. There is a special emphasis on knowledge sharing through faculty visiting programmes and student thesis projects, and cooperation workshops are hosted in both countries.

In the long run, the PGSB aims to create the conditions for research and STEM education in the Palestinian universities to thrive. We do this through the development of research clusters, which establish models for knowledge transfer and facilitate research activities at

Palestinian universities, and through the allocation of postdoctoral stipends through the PGSB returner programme, which supports the reintegration of PGSB alumni at Palestinian research institutions, provided they commit to offering fellows a faculty position after the end of their postdoc, thus ensuring brain circulation rather than brain drain. Both tools require the commitment of Palestinian universities to be fully sustainable.

To date, the PGSB has supported 21 bachelor thesis projects, 25 master thesis projects and 40 PhD projects in Germany, and 4 intern- ships of PhD students from An-Najah National University in Nablus ([one](https://www.najah.edu/en/academic/postgraduate-programs/program/phd-program-in-chemistry/info-card/) [of the few accredited PhD programmes in STEM in Palestine](https://www.najah.edu/en/academic/postgraduate-programs/program/phd-program-in-chemistry/info-card/)). We have also awarded five postdoctoral fellowship stipends in the framework of the PGSB returner programme. Additionally, more than 50 faculty exchanges between Palestinian and German Universities have taken place, which has resulted in new cooperation projects, joint student supervision and joint research endeavours. These individual efforts have been successful and resulted in 65 publications in peer-reviewed journals.

To help build sustainable scientific infrastructure in the West Bank and the Gaza strip, we also fund and organize internship placements in dual-studies programmes (which combine traditional classroom learning with on-the-job training, such as the [one at Al-Quds University](https://ds.alquds.edu/en/)) and online training and visiting opportunities in Germany for science management staff at Palestinian universities. This way we contrib- ute to the education not only of academic staff but also of technical and administrative employees, whose expertise is necessary for the everyday running of research facilities.

To maximize our impact on the development of research infra- structure in the Palestinian territories, it is necessary to go beyond sup- porting individual mobility, as such projects have definite timelines. To ensure a lasting impact, the PGSB is organized into research clusters, strategic groups of researchers with common research interests and a similar vision for future cooperation between universities and research institutions. The goal of the research cluster approach is to increase the openness to new ideas and the sustainability of the projects by chang- ing the focus from individual to joint projects, as well as to provide alumni with the opportunity to establish research projects based on their own interests and expertise, thus gaining leadership experience before their return to Palestine. Because effective knowledge transfer is highly dependent on the field of research (for example, due to the cost and complexity of equipment needed), forming topical research clusters also facilitates the identification of effective, sustainable coop- eration efforts in different fields. To date, research clusters have been established in agricultural sustainability, energy materials, nanosci- ence, neuroscience, photovoltaics, structural biology and sustainable mobility. We focus particularly on research topics with proven potential

for knowledge transfer and research partnerships with demonstrated contributions from both sides.

It is important for a science diplomacy project to be transparent and open to feedback, so it can best meet the needs of participants. Results from an interim evaluation conducted externally and based on the [OECD-DAC](https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm) (Organisation for Economic Co-operation and Development, Development Assistance Committee) criteria were very encouraging. The PGSB emerged as a highly relevant project, meeting important needs of all participants: providing Forschungszentrum Jülich with motivated young scientists and international visibility and Palestinian universities with capacity building and knowledge exchange. The coherence of the project was also judged positively, as the PGSB fills an important gap and has several unique selling points compared with other similar programmes, such as a focus on the Palestinian territories, a focus on STEM and an impact beyond indi- vidual mobility. As such, PGSB has become [an important pilot activity in](https://www.auswaertiges-amt.de/en/newsroom/news/pse-steering-committee/2342688) [German–Palestinian relations](https://www.auswaertiges-amt.de/en/newsroom/news/pse-steering-committee/2342688). The PGSB is on track to meet the project goals, especially in terms of capacity building and brain circulation. A next step will be adding more focus on faculty members and alumni to provide them with a platform to share and carry out their research interests, areas that especially suffered during the pandemic, when travel and laboratory access were severely restricted.

There are major hurdles to overcome with respect to missing infra- structure, resources and stability in the Palestinian territories, which are ultimately outside of the scope of the project. However, there are first indications that the PGSB is making an important contribution, starting with the returner programme, which will hopefully create a lasting effect on the higher education and research system in the Palestinian territories and on international cooperation opportunities for Palestinian researchers, even beyond the PGSB.

Considerations regarding impact and long-term viability are a main driver for future plans. PGSB participants and alumni are the strongest asset of the project. Supporting them as they build their own scientific careers and networks while continuing to offer exchanges for both research and learning purposes will be a big step towards achieving a lasting impact. This effect can be increased by expanding and solidifying the partner network both in Europe and in the Middle East and North Africa (MENA) region, which should happen naturally based on complementary research interests and the integration of science bridge alumni in research institutions. As application-oriented research is of particular interest to Palestinian researchers, innovation, entrepreneurship and technology transfer will also have a role in future

activities. Finally, although the cooperation focuses on research only, the political situation in the region plays an undeniable role in shaping future possibilities for research and networking in the Palestinian territories. Palestinian government and research institutions will need to reach their own decisions regarding how to prioritize research capac- ities, raise awareness about the challenges they face and the successes they achieve despite the difficult situation, and identify solutions that will best contribute to the good of all.

The recent opening to users of multiple beamlines at SESAME (synchrotron-light for experimental science and applications in the Middle East) in Jordan, of which Palestine is a full member, represents a big leap forward towards establishing local research hubs that will prioritize local employment and research interests. Going forward, sup- porting such initiatives will be crucial for maintaining strong scientific ties and ensuring a truly sustainable research cooperation with a lasting positive impact. To reach this point, the collaboration must be built on both excellent research and mutual respect and understanding. Future PGSB plans should encourage cooperation between universities and between academia and the private sector, which is key for developing the resources in Palestine. Further development of the network of PGSB alumni and German scientists and further training in proposal writing and fundraising to enable research projects independently of university budgets will support a needed transformation of Palestinian universities from teaching-only to teaching and research institutions. Analogue to building a physical bridge, this science bridge requires both individual hard work and motivation and commitment at the institutional level. Once built, however, it can facilitate uncountable crossings of both people and ideas, each with the potential to make a difference.

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