

# EquipSent – Enabling Sustainable Education, Everywhere

Elise Komarczuk\*, Laura Galazzo, Sergei Kuzin, Jörg Fischer, and Markus Teucher



**Abstract:** EquipSent is a volunteer-based non-profit organization aiming at creating conditions for sustainable teaching, study, and academic research worldwide. Used, functional equipment is collected by its members, who are responsible for matching the donations with the receivers in need. After starting in 2017, nine big transfers were accomplished that significantly impacted the quality of local scientific and educational life. In this article, we show how EquipSent as an organization strives to align with the Sustainable Development Goals (SDG) in Chemistry in Switzerland.

**Keywords:** Donations · Education · Research · Scientific equipment



**Elise Komarczuk** studied physics and chemistry at the University of Lille and moved to Helsinki to complete her master's studies in spectroscopy. In 2022, she started her PhD at ETH Zurich in the Jeschke lab, working in the field of EPR spectroscopy. This is where she came across EquipSent and joined in 2023, in the marketing team and became the leader of this team, in 2024.



**Markus Teucher** studied physics at FU Berlin where he also started his PhD in the field of EPR spectroscopy, which he completed at RU Bochum in 2019. After a post-doc at the MPI CEC in Mülheim, he moved to Zurich, where he currently works as a Lead Engineer for NMR Probes at Bruker Switzerland AG. He joined EquipSent in 2023 as a case leader and became board member and treasurer in 2024.



**Laura Galazzo** studied chemistry in Padua (Italy). After completing her PhD in Molecular Sciences in 2017 in the same university, she moved to Germany for a postDoc in the Bordignon lab, and subsequently to ETH, where she is now a post-Doc in the Jeschke lab working in the field of EPR spectroscopy. She joined EquipSent in 2023 as a case leader.



**Sergei Kuzin** studied chemistry in Moscow. After finishing his master's studies in 2020, he joined the Jeschke lab for his doctoral studies working in the field of EPR spectroscopy. He joined the case management team of EquipSent in early 2021 and shortly after this, became a case leader.



**Jörg Fischer** studied chemistry in Konstanz. After completing his master's studies in 2020 he moved to ETH where he is currently a PhD student in the Jeschke lab working in the field of EPR spectroscopy. He joined EquipSent in late 2020 and volunteered first in the equipment handling team. He joined the board of EquipSent in 2021 where he became co-president and head of the matchmaking team.

## 1. Introduction to EquipSent

In a world where a significant number of schools and laboratories have no access to suitable equipment for teaching and research activities, EquipSent steps in to make a difference. EquipSent was founded in 2017 as a non-profit volunteer-based association, with the goal to extend the life cycle of scientific equipment. While at the same time, EquipSent aims to improve the education and research capabilities in STEM (Science, Technology, Engineering, and Mathematics) subjects around the world by enabling hands-on training in educational institutions and research laboratories with limited financial resources.<sup>[1]</sup>

EquipSent collects functioning equipment that is no longer required from well-funded research institutions, corporate partners and schools mainly in chemical, biological and physical sciences, and distributes it among suitable destinations, according to the receiver's needs. In this way, not only instrumentation gets a second life, reducing waste production, but students in places with fewer resources have access to hands-on education. Moreover, research groups across the world can benefit from this approach to conduct state-of-the-art research in their laboratories.

EquipSent hence provides a platform to connect donors with recipients in need (Fig. 1).

EquipSent was founded by students at ETH Zurich in 2017. Meanwhile, the organization gained diversity in the work occupation of its members: in fact, while most of them are still working in academia, an increasing proportion are employed in companies. However, as a common denominator, the majority of them have a background related to natural sciences.

### 1.1 From Donation to Equipment Transfer

EquipSent manages the incoming donations and the requests for scientific equipment. A team collects and manages the equip-

\*Correspondence: E. Komarczuk, E-mail: elise.komarczuk@phys.chem.ethz.ch  
EquipSent, CH-8000 Zurich, Switzerland



Fig. 1. EquipSent's members at their General Assembly 2024.

ment and maintains a storage room in Zurich, and in the future, an additional hub will be opened in San Diego, California, in order to store donations coming from North America. The functionality of the equipment must be ensured by the donor and if possible EquipSent tests the equipment prior to the shipment. The same team is also in charge of reviewing incoming requests and establishing matches between available equipment and requesting institutions (Fig. 2). The so-called matchmaking includes in addition to the confirmation of the exact equipment also a detailed evaluation of the receiver. The background check includes:

- The receiver needs to demonstrate that the equipment will be used for non-commercial research or teaching purposes.
- The receiver has to explain the need, and which impact the equipment is expected to have. This includes the accessibility of the equipment within the institution and the number of users per year.
- The receiver needs to prove to have experience with that or a similar type of equipment and will be able to operate the equipment.
- Also, the institution has to confirm the required facilities and supplies to operate the equipment.

When a suitable match is identified, EquipSent initiates what they refer to as a 'case'. In this phase, a designated team member establishes contact with the potential recipient and remains the primary point of contact throughout the case. The case leader is embedded in the case management team which supports the case leader and works on the legal aspects for the shipment. As a non-profit organization, EquipSent operates without dedicated funding. They firmly believe that the cost of shipping, though incurred by the recipient, is negligible compared to the value of the equipment being provided. Additionally, requiring recipients to contribute financially towards shipping costs demonstrates a level of commitment, ensuring that the equipment will be used effectively. In cases where recipients are unable to cover shipping expenses, EquipSent encourages them to apply for grants, offering support throughout the application process. This approach guarantees that valuable resources are distributed efficiently while fostering a sense of responsibility and ownership among recipients. Besides these efforts, acquiring the money for the shipment is one of the main obstacles, which EquipSent and the receiver faces. When the financial obstacle is overcome, the case leader can carefully and safely pack the equipment and ship it, in close communication with the logistics company.

The amount of hours EquipSent needs to invest from the first request until the arrival of the equipment varies highly from case to case, however for a case leader an average of about 100 hours is needed.

## 1.2 An Organization Anchored in Sustainable Development

EquipSent operations align closely with several Sustainable Development Goals (SDGs), specifically goals 4, 10 and 12



Fig. 2. Workflow of EquipSent's 'cases'.

(Fig. 3). First and foremost, EquipSent contributes significantly to **Goal 4: Quality Education**. By providing access to hands-on scientific equipment, EquipSent enhances educational opportunities, particularly in low-income countries where resources may be scarce. Through their initiatives, students gain practical experience, fostering a deeper understanding of scientific concepts and preparing them for future endeavors.



Fig. 3. SDGs met by EquipSent.

Furthermore, EquipSent addresses **Goal 10: Reduced Inequalities**. By facilitating connections between research institutions in low-income and high-income countries, EquipSent helps bridge the gap in access to resources. This fosters collaboration and knowledge exchange, leveling the playing field and reducing disparities in scientific research and innovation.

Finally, EquipSent embodies the principles of **Goal 12: Responsible Consumption and Production**. By repurposing out-of-use yet functional scientific equipment from well-funded research institutions, EquipSent minimizes waste and promotes sustainable practices. Instead of disposing of these resources, EquipSent extends their lifespan, ensuring they continue to contribute to scientific advancement and education.

In essence, EquipSent's work supports several SDGs, driving progress towards a more equitable and environmentally conscious future.

## 1.3 Impact Evaluation

The impact evaluation is an integral part of the work EquipSent does. EquipSent is monitoring the impact of the donations in yearly surveys that are sent out to all receivers. The survey includes a detailed questionnaire to track the status of the equipment, as well as the number of users and the impact the donation had in the past year on research and teaching activities. This measure ensures that the donated equipment is still functional and allows for continuous impact evaluation.

## 2. Some Success Stories

Since its foundation in 2017, EquipSent has successfully transferred equipment to 9 destinations (Fig. 4), delivering over 800 kilograms of instrumentation worth over \$120,000. Regarding the impact on education, around 1000 students have benefited from hands-on experiments thanks to EquipSent. In the next sections, two successful transfers are presented to showcase the work of the organization.



Fig. 4. Map showing the destinations to which equipment has been transferred by EquipSent and to which it is still ongoing.

### 2.1 A Spectrometer for Sarajevo – The Very First Transfer

In 2018, a chemistry laboratory in Sarajevo, Bosnia and Herzegovina, contacted EquipSent regarding a graphite furnace atomic absorption spectrometer. By chance, this particular instrument had initially been donated to EquipSent by a laboratory at ETH Zurich, marking the organization's inaugural successful case (Fig. 5). The transfer of the equipment was facilitated by a couple of members *via* car, a moment captured in a video documentation.<sup>[2]</sup>

In 2020, Professor Sabina Žero reported that the spectrometer had been used for two classes, benefitting a total of 70 students, including guidance for two master's theses. Furthermore, in the same year, an article was published where the institute from ETH Zurich, which originally donated the equipment, was acknowledged.<sup>[3]</sup>



Fig. 5. Spectrometer received in Sarajevo.

### 2.2 Electronics for the University of Congo

The Christian Bilingual University of Congo contacted EquipSent in search of electronics in 2019. EquipSent collected donations of electronics, including oscilloscopes, generators, power supplies, amplifiers, and multimeters, from various laboratory courses and the electronic workshop at ETH Zurich. These

items were carefully packed into large wooden crates and shipped to Congo. Subsequently, a new laboratory was opened utilizing the donated equipment (Fig. 6).

Today, while some items require to be replaced, the majority of the equipment continues to be used for research, classroom demonstrations, and student projects. It has now contributed to the education and training of more than 50 bachelor students.



Fig. 6. Picture of the room in Congo, empty and then filled with pieces of equipment transferred by EquipSent.

## 3. An Essential Role of Marketing

The marketing team at EquipSent has an essential role, as visibility is required to attract potential donors. The team has crafted a distinctive brand identity, featuring a simple logo, with their signature blue and orange colors, which resonates throughout all their designs.

### 3.1 Addressing Different Groups

EquipSent's goal is to ensure that its message resonates with a wide audience. Naturally, within academic laboratories, but EquipSent also aspires to connect with companies that specialize in selling scientific equipment, recognizing that they may possess surplus or used items that are still operational but no longer suitable for sale, perhaps due to customer returns or minor functional issues.



Moreover, EquipSent's active members encompass individuals from diverse backgrounds, all united by their shared commitment to volunteering and revitalizing scientific equipment.

### 3.2 Outreach Strategies

EquipSent maintains an active presence across various social media platforms, including *LinkedIn*, *Instagram* and *X*, engaging with their audience and sharing updates regularly. Additionally, whenever their members attend scientific conferences, they seek opportunities to showcase the organization through posters or brief presentations, fostering connections and raising awareness (Fig. 7). Furthermore, contributing articles to esteemed publications, such as this edition of *CHIMIA* serves as an invaluable avenue for reaching a broader audience and disseminating their message effectively.



Fig. 7. A member introducing EquipSent at the NCCR Microbiome Forum 2024 in Zurich.

## 4. Conclusion and Outlook

EquipSent is a non-profit organization that strives to establish sustainable high-quality education in developing countries, in line with the SDGs in Chemistry in Switzerland. By giving a second life to used equipment, it is possible to minimize waste production and at the same time provide quality education worldwide, which aids in reducing the inequalities between low- and high-income countries.

To further increase the impact of EquipSent, its members are actively trying to plant more seeds carrying the idea of reusing and redistributing otherwise used resources, which can be achieved by gaining more members, collaborations or establishing new hubs. However, this idea is independent of EquipSent as an organization. It would be great if others would adopt it and give it their own spin.

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[1] <https://equipsent.org/>

[2] <https://www.youtube.com/watch?v=xn51FzivINw>

[3] J. Huremović, S. Žero, E. Bubalo, M. Dacić, A. Čeliković, I. Musić, M. Bašić, N. Huseinbašić, K. Džepina, M. Cepić, N. Muratović, A. Pašalić, S. Salihagić, Z. Kravac, J. Zelić-Hadžiomerović, S. Gojak-Salimović. *Air Qual. Atmos. Hlth.* **2020**, *13*, 965, <https://doi.org/10.1007/s11869-020-00852-4>.

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