

ETH Zürich Foundation

Uplift

The impact of giving N°11

**Prudent planning
for safe cities**

Doctoral student
Prabhat Joshi

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**Cross-generational
solidarity**

Donor
Hartmut Rudmann

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Funding focus

**Sustainable
development**

For sustainable development worldwide



ETH Zurich / Markus Bertschi

Vanessa Wood

Vice President for Knowledge Transfer and Corporate Relations

In a globalised world, the only way to meet present and future challenges is by joining forces and working together. This is why researchers at ETH Zurich team up with industry partners, NGOs and other actors across the world to promote sustainable development through innovative solutions and technological advances.

A representative survey conducted by ETH Zurich's Center for Development and Cooperation (NADEL) has shown that this approach is welcomed by the Swiss population, which is concerned about the present scale of global poverty and believes that Switzerland should take greater action. One partnership currently underway is the Master's degree programme in mechatronics engineering, developed jointly by ETH and Ashesi University in Ghana and designed to train future leaders for industrial development in sub-Saharan Africa. The project was made possible by donors, with additional support from industry partners. The first cohort of 26 students from seven African countries started their studies in January 2022, with many more due to follow: a cause for optimism not only for sub-Saharan Africa but for its entire global network.

IMPRINT

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Nepal – Zurich and back

Prabhat Joshi is researching ways to reduce pluvial flood risks in data-scarce urban environments. The aim is for his findings to be incorporated into urban planning in Nepal.

4 Growing up in Lalitpur near Kathmandu, Nepal, Prabhat Joshi saw how the rapidly expanding city was steadily developing into a concrete desert and, at the same time, how problems like flooding and water scarcity were becoming ever greater. It was this that triggered his interest in sustainable urban water management and urban planning. But the fact that his path was to lead him to Eawag, the aquatic research institute in the ETH Domain, was ultimately a question of chance.

Funding facilitates research

After completing his Bachelor's degree in environmental engineering at Kathmandu University, Prabhat Joshi worked as a research assistant in Bangkok. "It was then that I happened to attend an interesting online lecture given by Christian Zurbrugg from Eawag, who also teaches at ETH. And finally, being lucky enough to receive an Excellence Scholarship, I was able to do my Master's at ETH," the young researcher explains.

After graduating, Prabhat Joshi worked as a scientific assistant at ETH, Eawag and a non-profit organisation in Nepal. When offered the opportunity to further develop

his research on sustainable drainage management in urban areas in a doctoral programme at Eawag, he applied for a scholarship from the Engineering for Development (E4D) Doctoral Scholarship Programme. Funded by donations, the programme supports ambitious researchers from low-income countries during their doctoral studies at ETH. The condition is that their research has a positive impact on people's lives in these countries.

"The expertise I've been able to acquire thanks to financial support from donors enables me to help shape the development of my home country in a positive way."

Prabhat Joshi



Boosting data-scarce regions

In his Master's project work, Prabhat Joshi had looked at severe rainfall events and their consequences, using data from Kathmandu. "Heavy rainfall often leads to an overload on the urban drainage systems. The conventional approach is to expand the existing structure, but this is costly and often not sustainable," he says. He explored the potential of what is known as blue-green infrastructure (BGI), elements of which include green spaces like parks, roof gardens and playgrounds. "Areas of open ground can act as infiltration surfaces, temporarily holding part of the rainwater and relieving the burden on the drainage system. They also contribute to biodiversity and counteract overheating," he explains. Now working on his doctorate, the young researcher is focussing on how the risk of pluvial flooding can be assessed and mitigated in regions where little data is available. For this, he plans to develop models based on statistical data and aerial photographs that help assess the existing urban drainage systems more accurately. He will also observe the performance and capacity of blue-green infrastructure over a longer period and work out how urban drainage and BGI could be optimally combined.

The idea is for his research to be applied to other data-scarce regions too. "In many countries, urbanisation is taking place with no attention paid to ensuring functioning water cycles. At the same time, climate change is causing increasingly severe weather events and the risk of flooding is rising," Prabhat Joshi points out. The consequences range from endless traffic jams to major property damage and the spread of water-borne diseases – and it can take a long time for a city and its inhabitants to recover.

Focus on practice

It's therefore all the more important for Prabhat Joshi that his research outcomes

make a concrete impact on reducing the risk of flooding in cities in the future. For this reason, his work also involves liaising with various organisations in Nepal and holding workshops with decision-makers such as urban planners and members of local administrations. He also wants his models to be available online once ready. Prabhat Joshi sees his professional future in Nepal, where he can put the expertise he has acquired at ETH and Eawag to beneficial use. "In an advisory capacity, I'd like to help ensure that important resources, such as water and energy, are better integrated into urban planning. This is how I could make my contribution to sustainable development in Nepal."



More on the programme at:
ethz-foundation.ch/en/excellence-scholarship

Impact through research funding

The Doctoral Fellowship for Global Impact, formerly the E4D Doctoral Scholarship, enables students from low- and middle-income countries to study for a doctoral degree and research innovations with the potential to improve the lives of people in poor and fragile regions.



More on the programme at:
eth4d.ethz.ch/en/eth4d-fellowship

Strong networks



With the ETH for Development initiative, Adina Rom and her team bring ETH forces together to promote sustainable global development. One example is the Master's degree programme that trains highly qualified future leaders in Ghana.



Marriette Mertens, co-programme manager of the partnership with Ashesi University is in regular contact with all participants in Zurich and Accra.

8 *ETH lecturers and their colleagues from Ashesi University in Ghana started training African students in mechatronics engineering in January 2022. How did this collaboration come about?*

ADINA ROM – It all started with an idea by Edoardo Mazza, Professor at the Department of Mechanical and Process Engineering at ETH, to create a new engineering degree programme with partners on the African continent. After teaming up with Sarah Springman, who was Rector at the time, and Isabel Günther, Professor of Development Economics, plus a number of industry partners, we developed the idea further and, in 2019, all travelled to Africa to visit various universities and discuss the fundamental idea. We were lucky enough to find the ideal partner in the visionary and innovative Ashesi University in Ghana. Not only does the university offer a high standard of education, but many of our industry partners are operationally present in Ghana too. The programme was made possible by the generous support of donors such as the Swiss State Secretariat for

Economic Affairs SECO, Adrian Weiss, the Arthur Waser Foundation and the Louis Dreyfus Foundation.

How do both sides benefit from the collaboration?

Africa is a young continent with high economic growth. Young people at the beginning of their careers are called upon to be leaders in emerging industrial sectors. There is great demand not only for technical expertise, but also for knowledge in the field of sustainability, interdisciplinary work and ethical leadership. To meet this demand, educational institutions need to be expanded. And this is where we come in – by offering our experience, we can support and help shape this development. As a result, Ashesi University is now able to train engineers at Master's level for the first time. At the same time, ETH lecturers receive new inputs from their interactions with African students and lecturers, and our industrial partners benefit from talented leaders with an excellent education.

How do you ensure that the value created remains on the African continent?

Many of the graduates will be given job offers from our industrial partners. In addition, the selection process was designed to single out students with particular motivation to contribute to the development of their home countries.

In what other ways does ETH4D promote sustainable development?

While one focus lies on innovation and research for poverty reduction, the other is set on training future leaders with a global perspective, as illustrated by our partnership with Ashesi or the summer school with KNUST, another Ghanaian university. At the moment, we have two new projects in the pipeline: the first is the Doctoral Fellowship for Global Impact, set up to grant scholarships to talented students from low-income countries who will develop solutions for global challenges at ETH. The second project, the Social Entrepreneurship Fellowship, aims to enable the research findings to be implemented and scaled up. Our doors are open to all fields at ETH Zurich and we want everyone together to expand their networks within ETH, and internationally, in order to build a more inclusive and more sustainable world. For this to happen, partnerships need to be forged with universities around the globe and researchers connected with decision-makers from policy, industry and society. Around 40 ETH professors from a range of disciplines work actively with ETH4D.


What is ETH's role in ensuring effective development and cooperation?

Making a difference requires social and technological innovation, and there's hardly a better place for that than ETH. This is demonstrated by products such as the low-cost and robust transport ventilator "breathe", which was developed for use in low-income countries, or the Engineering for Humanitarian Action initiative launched jointly with EPFL and the ICRC. It's also very

important for us to anchor these topics in students' minds through lectures, summer schools and events: when graduates understand what fair global development means, they can contribute to making a difference.

You've been involved in international development throughout your career. What is it that drives you?

Even as a child, I used to think a lot about justice. I'm driven by the urge to understand inequalities and find ways to diminish them. I believe that you can – and should – use your own privileges to create opportunities for others and change the world for the better.

 Learn more about the partnership between ETH Zurich and Ashesi University: ethz-foundation.ch/en/ashesi

Introducing

Adina Rom heads ETH for Development (ETH4D) and works as a development economist at the Center for Development and Cooperation (NADEL) at ETH Zurich. She is co-founder of GAIN, a network that supports African students in their academic career, and a spin-off named Policy Analytics that helps organisations assess their social and environmental impact. After studying public policy at the Harvard Kennedy School, she earned her doctorate at ETH in the Development Economics Group. In addition to voluntary work, she spends her free time hiking, in the yoga studio or swimming in the Limmat river.

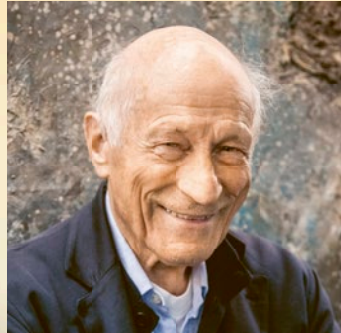
Joint efforts for sustainable development

There are various reasons why donors get involved in ETH projects and initiatives supporting international development and cooperation. Four voices:



"Working with ETH researchers, our aim is to find out what contribution cooperatives can make to social and economic development in an ever-changing world. The results are consistently communicated to the public so that each and everyone of us can benefit." Belinda Walther Weger, Head Public Affairs & Sustainability, die Mobiliar

Founded on a cooperative basis, Mobiliar has been funding research at ETH Zurich since 2013.



"Africa is the continent of the future and the future of the continent hinges on education at all levels. The collaboration between ETH Zurich and Ashesi University in Ghana now offers us the optimal opportunity to enter into tertiary level education – at the highest standard." Arthur Waser

The Arthur Waser Foundation has been funding secondary level technical education in Ghana for many years.



"We join forces with industrial companies and foundations to support the education of future leaders in Ghana. We are convinced that education and training are essential for driving social and economic development in sub-Saharan Africa."

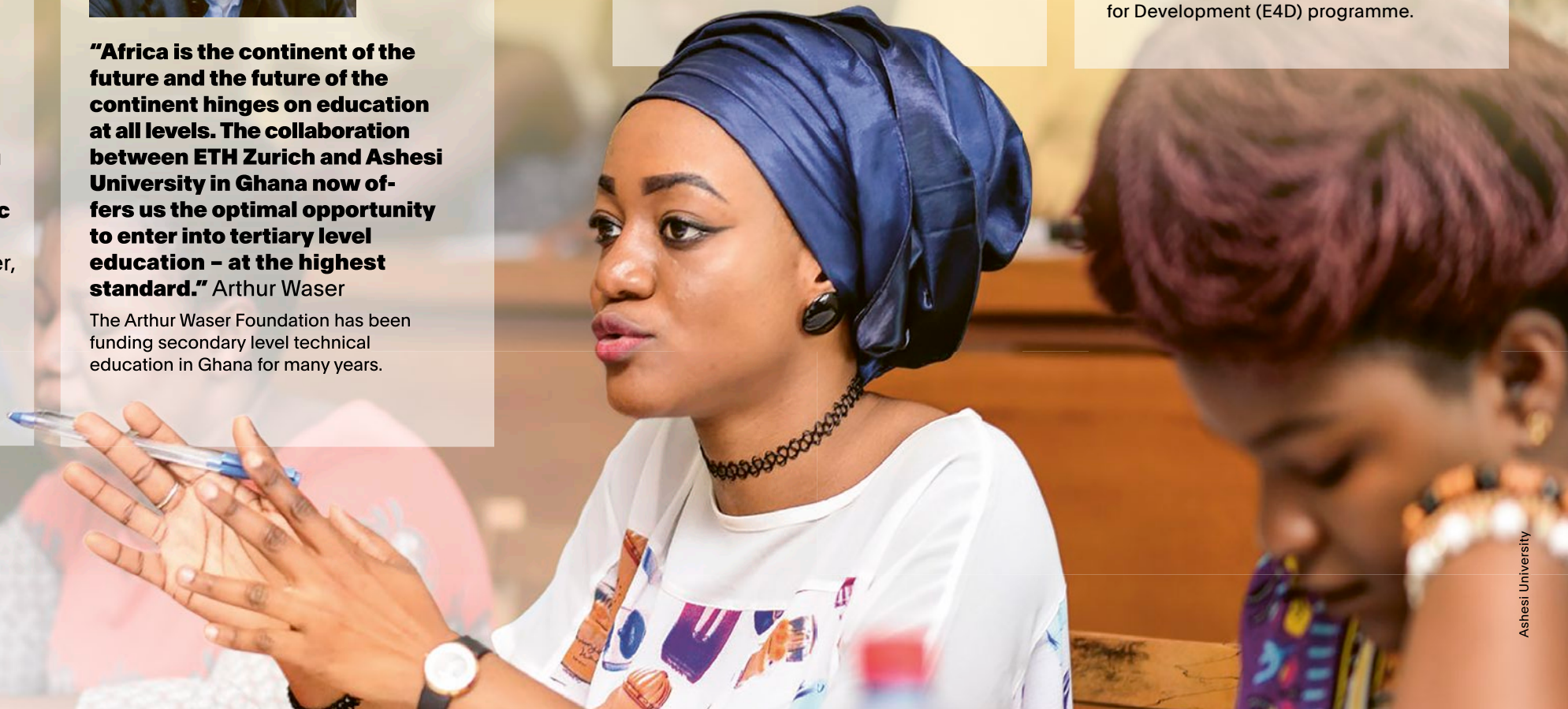
Margarita Louis-Dreyfus

The Louis Dreyfus Foundation supports the cooperation between ETH Zurich and Ashesi University.



"We believe that education plays a crucial part in creating sustainable development and reducing poverty. This is why we enable students from low-income countries to do a doctorate or follow continuing education courses at ETH; so that their skill and knowledge can flow back into society and they can make a difference in their home countries." Samih Sawiris

The Sawiris Foundation for Social Development supports the Engineering for Development (E4D) programme.



Time to look back

Hartmut Rudmann's story is one of a self-made man. Once dependent on a scholarship himself, the ETH alumnus is now happy to support the ETH scholarship programme.

What kind of environment did you grow up in?

HARTMUT RUDMANN – I grew up in Germany in a small village near Freiburg im Breisgau, surrounded by manual workers and farmers. I was the first in our family to earn an Abitur school-leaving certificate and, from a very young age, felt the urge to see more of the world.

What brought you to ETH?

In 1987, two scientists from IBM's research laboratory in Zurich received a Nobel Prize for the discovery of a new type of superconductor made of ceramic. I remember reading about this in the newspaper as a teenager and being fascinated. Then, at the beginning of the 1990s, I met someone in the athletics club who was to change my life: a materials scientist from Dresden, who trained with us for half a year. He told me about his subject and, because I was so enthusiastic, suggested I visit an acquaintance of his at ETH who was studying for a doctoral degree in materials science. This I did – and some time later I started my ETH studies. However, after a year, I found myself in trouble. The amount I'd been earning as an assistant at ETH was not enough to finance my existence. Fortunately, I was able to apply for a scholar-

ship and was successful. The older I get, the more I realise how important this scholarship was for my future path: without it I would have been forced to throw everything in at ETH.

You now support the ETH scholarship programme yourself.

There are people today who find themselves in a similar situation to mine 25 years ago. For me, it's fantastic if I can support a young person like this. I see it as cross-generational solidarity.

For your doctorate, you left ETH for MIT.

Even as a child I used to dream of moving to the US. So I applied to Philadelphia and MIT – and received offers from both. I was hesitant to accept the MIT offer as I was so awe-struck by this prestigious institution. By chance, a fellow student from ETH who happened to be at MIT told a professor about me. The professor called me immediately and asked whatever was I thinking? MIT wanted me! With all the applicants they have, I'm still amazed today that someone picked up the phone and actively pushed me to come! And it makes me realise just how much random events can shape our future lives.



“There are people today who find themselves in a similar situation to mine 25 years ago. For me, it’s fantastic if I can support a young person like this.”

Hartmut Rudmann

What was your goal when you returned to Switzerland after four years in the US?

I was intent on working in a startup, thinking that I could always get a safe job later. Luck had it that I was then invited to an interview at an optics startup in Zurich Altstetten, a small company of just ten. I only got the job because another candidate turned it down. In the end, I stayed with Heptagon for 15 years. The first half of these 15 years was a disaster: we made all the mistakes you can make and, in 2010, the company was on the verge of collapse. We then hired a new CEO, and the second half was completely different. Without much experience, you tend to think that if the technology is good, that’s enough. However, a company will only succeed with a functioning team and a healthy mistake culture in place. It was only when we had this that Heptagon grew big. I took over product development. At the beginning, I was the only one in my team. By the end, I was leading a staff of 500 in Singapore and Rüschlikon. It’s exciting to be part of a growing startup – and of a successful exit, as was the case for me in 2018.

What does life look like today?

I advise startups, including startups at ETH. For a company in the US, I remotely manage a small team in Taiwan, where the experience I gained in Singapore as a bridge-builder between West and East

comes in very helpful. But most of my time is now devoted to my three teenage children. For a long time, I spent one week a month in Asia, working day and night at times. At first, the children were surprised that I was at home so much, cooking lunch and helping with homework. I enjoy this precious time with them immensely.

What would you like to pass on to your children?

Have the courage to try something new and keep at it. There are times when you must be prepared to make mistakes. It’s difficult to cultivate this mindset because at school we learn that you only earn a good mark if you answer questions correctly. In business life, the line between what you know and what you don’t know is fuzzier. In fact, you often have to admit to yourself that you don’t know the answer. Being aware of this is a positive attribute – as you first have to find out where the limit to your knowledge lies before you can move it.



Find out more about ETH scholarships:
ethz-foundation/en/eth-scholarships

Innovative approaches for humanitarian aid

Across the world, millions of people rely on humanitarian assistance. With their Engineering for Humanitarian Action initiative, the ICRC, ETH Zurich and EPFL have been leveraging innovative technologies to find solutions to better help people in need since 2020.





Thanks to cooperation between the ICRC, ETH and EPFL, people in fragile areas will benefit from technological advances too, such as improved sustainability in construction projects.

The International Committee of the Red Cross (ICRC) provides aid to people around the world affected by conflict and armed violence. In December 2020, ETH, EPFL and the ICRC launched their Engineering for Humanitarian Action initiative to help improve efficiency in planning and implementing humanitarian aid. The idea is to deploy the expertise and technologies from the two universities where it is most urgently needed – in humanitarian crises. In the last two

years, 12 projects have been initiated, focusing on energy and the environment, data science and cyber security, as well as digital health and medical technologies.

More accurate maps and efficient logistics

One example is the project run by ETH professor Konrad Schindler, his EPFL colleague Devis Tuia and ICRC geodata analyst Thao Ton-That Whelan that aims to use arti-

cial intelligence to map vulnerable populations. By analysing geospatial data sourced from satellite images, population numbers will be estimated which can then be integrated into ICRC maps. This will help ICRC to plan its humanitarian responses more effectively.

Another project, run by ETH professor Stephan Wagner, researcher Bublu Thakur-Weigold and ICRC's Head of Global Supply, Ruben Naval Artal, is designed to ensure reliable distribution of medical supplies in conflict zones. By analysing historical data on supply chains and examining process structures, their goal is to improve medication availability and avoid waste.

Secure digital channels and sustainable construction

ETH professor Adrian Perrig and his team, together with Vincent Graf Narbel, ICRC technology advisor, are addressing the challenges posed by the increasing digitalisation of data flows. To protect the highly sensitive data of humanitarian organisations from attacks by unauthorised users, a cloud environment and communication infrastructure are needed to ensure access that is secure.

In a project run by ETH professor Guillaume Habert, EPFL researcher André Ullal and ICRC project manager Pavlos Tamvakis, the aim is to improve the sustainability of ICRC construction projects in conflict regions. Since data is often lacking in countries where the ICRC operates and sustainability indicators vary greatly, existing technologies and systems are not suited to constructing buildings sustainably. The researchers want to upgrade the current technological infrastructure so that it can be used in environmental impact assessments in conflict regions.

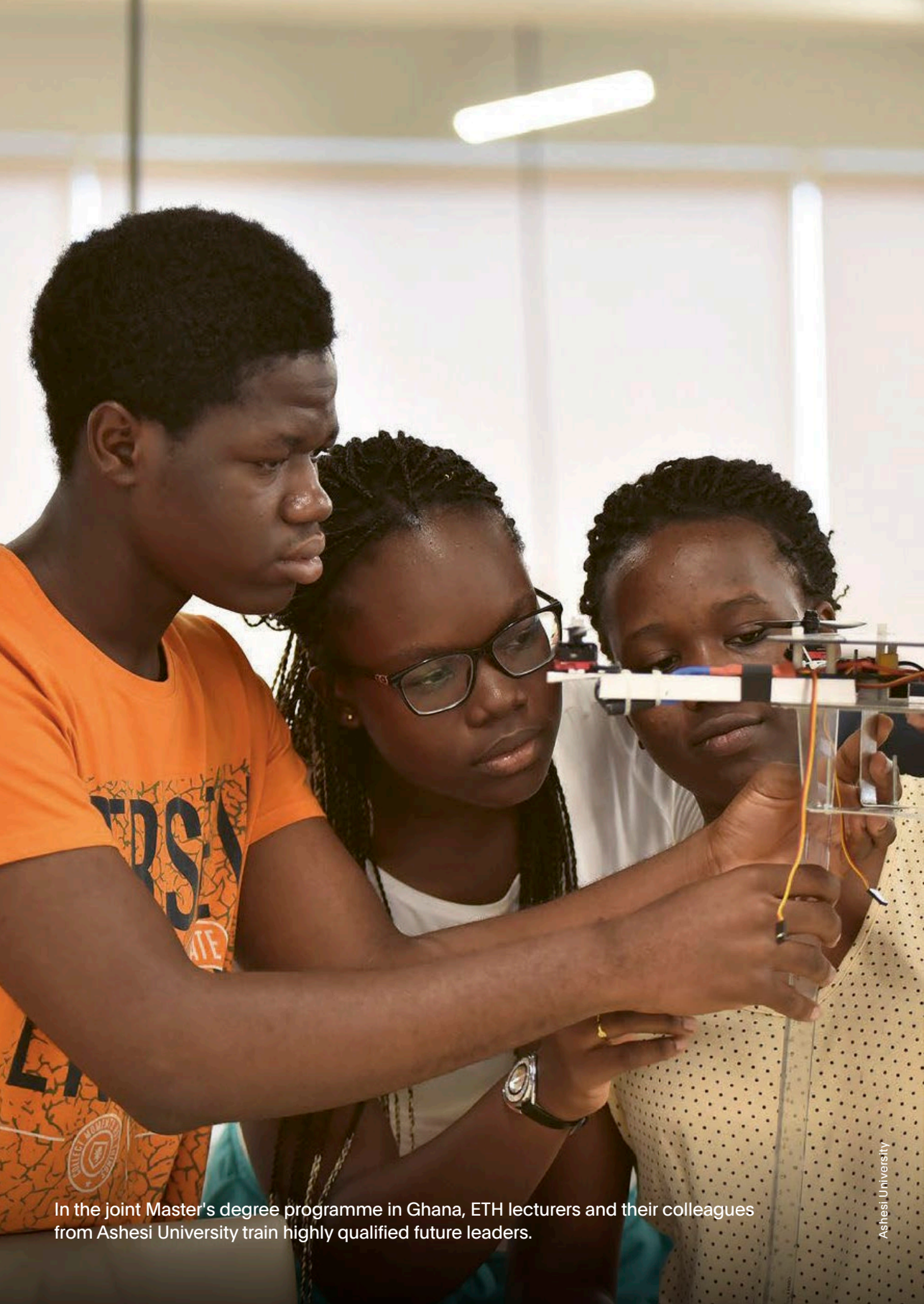
“The potential of digital technologies to support humanitarian action has not yet been exhausted. Thanks to cooperation between ETH, EPFL and the ICRC, promising solutions can be applied in the future where they are most urgently needed: among people directly affected by humanitarian crises.”



Dr Markus Neuhaus, Member of the ETH Foundation Board of Trustees, Vice President of the Board of Directors of Barry Callebaut Group and Orior, Member of the Boards of Directors of the Baloise Group, Galenica and Jacobs Holding



Find out more about the initiative:
ethz-foundation.ch/en/icrc



In the joint Master's degree programme in Ghana, ETH lecturers and their colleagues from Ashesi University train highly qualified future leaders.

Ashesi University

Your support

The importance of science and technological innovation – and tackling challenges together – is greater than ever. Responses are needed to the pressing issues faced by us all: from climate change to our health. **Help support projects for sustainable global development.**



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