Issue 2 May 2014

GYA connections

The magazine of the Global Young Academy

Insights from the GloSYS study: Irene Friesenhahn and Catherine Beaudry

Tips for Global Leadership: Rees Kassen

GYA member profiles:
Ranjini Bandyopadhyay
Peter Ngure

GYA member Federico Rosei on his new UNESCO chair

Report on the GYA African regional meeting

Global Young Academy
The voice of young scientists around the world

Contents

Summer 2014

About the GYA

The Global Young Academy is an international organization that is the voice of young scientists worldwide. Our goal is to empower and mobilize early-career researchers to use science to make a better world.

Co-Chairs: Rees Kassen (Canada)
Sameh Soror (Egypt)
Managing Director: Heidi Wedel (Germany)

Telephone: +49 30 20370-559 (Berlin)
Email: info@globalyoungacademy.net

Find out more at www.globalyoungacademy.net

GYA Connections is published semi-annually. Suggestions for content should be sent to the editor.

Editor: Michael Sutherland (UK)
mls41@cam.ac.uk

Funding: The GYA gratefully acknowledges core funding from the *German Federal Ministry of Education and Research (BMBF)*, as well as support from the *IAP*: The Global Network of Science Academies. Support for individual projects is provided by e.g. the *Robert Bosch Foundation* and the *Volkswagen Foundation.*

GYA Co-Chair Sameh Soror

A year has passed since we met during our annual general meeting (AGM) in the northern hemisphere, in Halle, Germany. This year we are gathering in the southern half of the globe, in Santiago de Chile, which reflects just how global the GYA is. It will be a special meeting with a Latin American flavor. The meeting theme this year is "Natural Resources in a Finite World", and discussions will focus on management of natural resources and improving the human condition to achieve sustainable development, particularly in the developing countries. If you're reading this issue of GYA Connections at the AGM, I would like to welcome all the participants and speakers, some of whom have come a very long way to participate in this special event. I am confident, like all previous AGMs, that it will be a very successful meeting due to your active participation. A special welcome goes to our new members, who joined the GYA in 2014. The induction of the new members during the meeting will be a historic moment as for the first time the GYA will be at full capacity (200 members).

When we look back on the first half of 2014, one of the most important achievements for the GYA was launching the Global State of Young Scientists or "GloSYS" report. The report attracted a fair amount of attention and was featured in several prominent scientific media outlets such as Nature and Science magazines. See the report about GloSYS on pages 5 to 8 in this issue to learn about some of the conclusions from significant study. It is my hope and believe that the AGM this year will again witness the initiation and consolidation of similarly ambitious and influential projects.

Attendees at the GloSYS press conference in Berlin consult with colleagues.

Cover Photo: *GYA Co-Chair Sameh Soror cuts a cake with delegates at the First Africa Young Academies Regional Conference, held in Nairobi Kenya in February 2014. See more pictures from the meeting in page 12 of this issues of Connections.*

Image © DUK/photothek (2014)

GYA Co-Chair Rees Kassen and GYA member Sherien Elagroudy on stage with young scientists at the inaugural meeting of the UN Scientific Advisory Board in Berlin

Over the Moon: GYA members deliver joint statement to the new UN Scientific Advisory Board

Membership of the GYA has led to a number of interesting opportunities for me, and one of the most exciting was a recent invitation to give a short talk at the inaugural meeting of the Scientific Advisory Board (SAB) of the UN Secretary-General in Berlin in the presence of UN Secretary-General Ban-Ki Moon.

It came as a great surprise to me to receive an email from Dr. Lutz Möller, Head of the Division of Science and Human Rights at the German Commission for UNESCO explaining that "I have been considered as an extremely apt candidate to speak in the opening ceremony of this new committee".

Including GYA Co-Chair Rees Kassen and myself, a total six leading early career researchers were invited, representing diverse disciplines and world regions. As the "voice of young scientists" we were asked to present a five-minute joint statement summarizing our expectations of the new UN science advisory board.

In advance of the meeting we exchanged numerous emails and held conference calls to decide the structure and content of the statement. Capturing the ideas and enthusiasm of the participants in such a short presentation was not an easy task, especially given our diverse background. After much discussion, we eventually settled on a speech that encouraged the SAB to consider mechanisms to support inclusive public science and open access to data, to increase public trust in decision-making, and to facilitate engagement of the scientific community with decision makers.

The opening ceremony in Berlin was attended by more than 500 persons, including eminent German and international policy-makers, scientists, ambassadors and the media. They were addressed by Frank-Walter Steinmeier, Minister for Foreign Affairs of Germany, Ban Ki-moon, Secretary-General of the United Nations, and Irina Bokova, Director-General of UNESCO.

Our statement, which you can find on the following page, was delivered by the six young scientists in turns. The section I read stressed that young scientists are ready and willing to help the SAB in its efforts to provide the best advice to decision-makers. We concluded by strongly encouraging the SAB and associated UN bodies to make use of growing networks of young scientists, including the National Young Academies and the GYA. It was certainly a very exciting experience, and I hope that our message leads to greater participation of young scientists in UN activities.

Sherien Elagroudy is an Associate Professor of Environmental Engineering at Ain Shams University in Cairo

Text of the Young Scientist's Address to the inagural meeting of the UN Scientific Advisory Board. Berlin, Germany

Image © DUK/photothek (2014)

GYA member Sherien Elagroudy poses for a photo with UN Secretary-General Ban-Ki Moon at the inaugural meeting of the UN Scientific Advisory Board

"Mr Ban Ki Moon, Secretary-General of the United Nations, Ms Irina Bokova, Director-General of UNESCO, Mr Frank-Walter Steinmeier, German Minister of Foreign Affairs, Respected SAB members, Ladies and Gentlemen.

Imagine a world of plenty, in which the wealth of nations is measured not by GDP but by social inclusiveness and ecological wellbeing. Imagine a global economy that benchmarks its success against planetary and social boundaries, corporate transparency and institutional accountability. This is not our world of today. It is the emerging world of sustainable development, a world of social equity, distributive justice and environmental resilience.

In working towards sustainability, young scientists can and should play an important role. We stand before you, not only as individuals from diverse regions and disciplines, but also as the inheritors of whatever decisions are made today. We therefore have vested interests – and of special interest to us is that evidence be appropriately used in decision-making. Ensuring this is the key task of the Scientific Advisory Board.

In this vein, we encourage the Scientific Advisory Board specifically to consider mechanisms to support inclusive public science. Public science is science that contributes ideas and innovation for the public good. It strengthens public engagement. And it improves the autonomy of knowledge production. Public science and the democratization of knowledge are based on the conviction that human development must have priority over profit-orientation.

The Scientific Advisory Board can play an important role in promoting public science by:

- Supporting open access to data, infrastructure and results so that knowledge can be shared more widely and equitably across nations;
- Increasing public trust in decision-making through more transparent use of knowledge.
- Facilitating the scientific community to engage more directly with decision makers, the media and the broader public. The goal here should be to ensure that knowledge for sustainability is responsive and relevant to local needs, and can complement well-established science-industry partnerships.

"We encourage the SAB specifically to consider mechanisms to support inclusive public science. Public science is science that contributes ideas and innovation for the public good."

Young scientists are ready and willing to help the Scientific Advisory Board in its efforts to provide the best advice to decision-makers. We strongly encourage the Scientific Advisory Board and associated UN bodies to make use of growing networks of young scientists, including Young Academies, to nurture a joint sustainability-oriented mission for the next generation scientists.

Furthermore, we encourage the Scientific Advisory Board to consider other mechanisms to foster outreach, engagement and transparency in its activities. Particularly suitable should be platforms that cut across established scientific and political sectors, including the institutions related to sustainable development created at the UN.

The commitment towards a sustainable future must be strengthened not in rhetoric but in everyday policy processes. The Scientific Advisory Board can play a crucial role in democratizing knowledge generation and sharing, building public trust, and supporting the active partnership of scientists and civil society networks and their effective integration into decision-making. Young scientists are ready to help. Thank you.

The GloSYS Project
Makes its Mark

Irene Friesenhahn

With the precursor phase complete, a first report on the GYA flagship "Global State of Young Scientists" or GloSYS project was recently released at a press conference in Berlin. Project officer Irene Friesenhahn tells Connections about some of the preliminary findings of the report, and the key recommendations that were communicated to the assembled media.

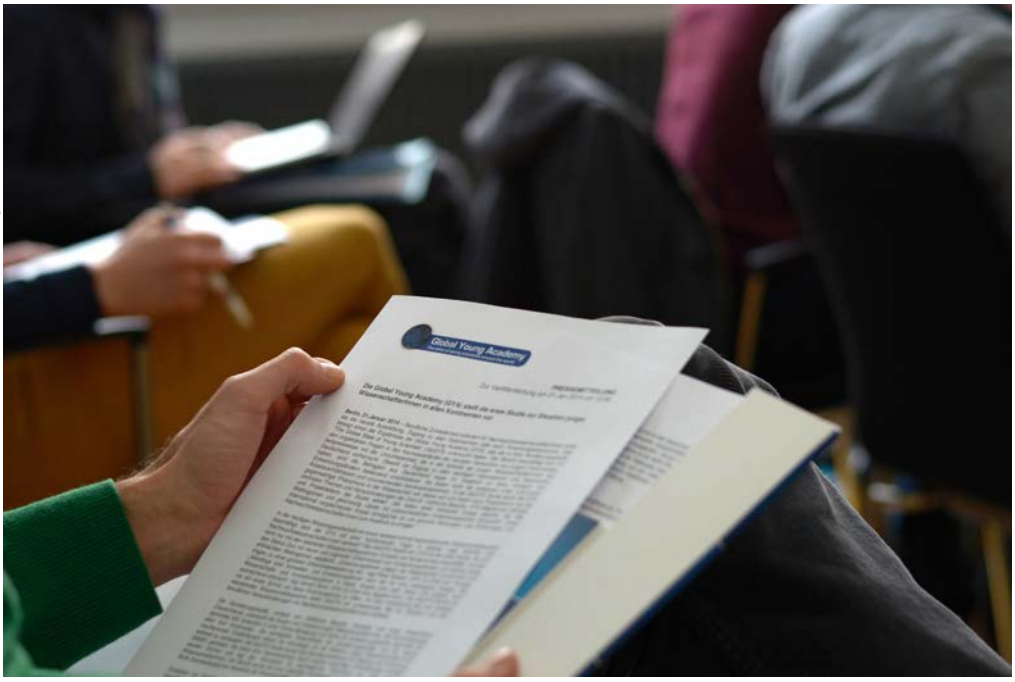
Above: Irene Friesenhahn shares the results of the GloSYS precursor study with the media at a press conference in Berlin.

The GYA-led Global State of Young Scientists (GloSYS) project is the first study to collect data on career prospects and opportunities for young researchers from an international perspective. The results of a one-year precursor study have recently been released, examining in detail the thoughts and opinions of scientists from twelve countries across all continents, providing a snapshot of the diverse state of young scholars around the world.

The 66-page report was presented at an official launch event at the Berlin Brandenburg Academy of Sciences and Humanities (BBAW). The results show that young scholars are united by their enthusiasm and motivation for their work, with 80% of respondents saying that it's the passion for science that encourages them to pursue a research career. Despite this enthusiasm, young scientists face challenging career issues - from poor levels of training or mentoring to a lack of resources necessary for developing strong, independent research programs.

One of the key findings of the GloSYS report is the need for increased early-career support and training. A commonly expressed desire was the wish for a more systematic and constructive approach to support and mentoring, as this was perceived as important for the professional and personal advancement of young scholars. The data showed that young scholars have a variety of role models - 63% of respondents said senior colleagues were their most important advisers, 39% mentioned mentors, and 34% said family and friends.

While these role models can provide useful help in developing the skills necessary for a career in science, many young researchers felt that the training they received in their early careers left them poorly equipped for the duties and responsibilities once they reach a permanent position. This was felt to be particularly acute for early-career scientists in MENA (Middle East and North



Attendees at the GloSYS press conference read over the summary and press statement

Africa) countries, where 56% or respondents felt that the lack of training opportunities was a serious concern, with high numbers of young scholars in Africa and Asia sharing the same sentiment.

The GloSYS study also looked at issues related to the career progression of young scientists. Most respondents listed the number of publications and reputation of the journals they publish in as the two top criteria for career advancement, followed by funding, paper citations, and awards. However many young scholars, in particular those in developed nations, felt that they are not in control of their own career progress as this is often also dependent on luck, the availability of suitable positions and the number and the quality of their competitors. An increase in transparency and fairness of the assessment process was felt to be an important improvement.

Another issue that was highlighted in the report is the extreme workload that is expected from early career researchers to advance professionally. On average respondents spent 55 hours at work each week during the academic term. The data shows that 16 of those hours were allocated to research, almost 11 hours to teaching, 8 hours to administration and services, 7 hours to training and supervision, and 5 hours to managing groups. This is far ahead of the European average of 37 hours of work a week, and even in excess of the average working week of 44 hours in Japan. This heavy workload places obvious constraints on family life, causing particular difficulties in the case of women researchers. There is a clear need for family-friendly policies that allow young scientists the freedom to be creative and productive while balancing professional and personal duties.

Finally, the report highlighted that a shortage of human resources and equipment was an obstacle for early career researchers around the world. This was most often reported as a difficulty in Asia (64% of respondents) and MENA countries (61.5%), followed by Africa (51.6%) and Europe (51.4%). Support factors such as adequate infrastructure and the availability of start-up grants, an increase in job stability and family-friendly policies allow young scientists the freedom to be creative and productive while balancing professional and personal duties, and as a result enhance the progress of national research systems.

6 key recommendations from the GloSYS study

1. Address the lack of resources, whether material or personnel, and the lack of funding for young scientists across regions of the world.

2. Develop a nurturing culture aimed at providing better and more appropriate mentoring and supervision at all levels of early career, from PhD to the first 5-10 years of academic independence and beyond, so that researchers can learn and feel supported.

3. Value Work-Life Balance. Employers should provide means by which scholars and researchers can achieve a better work-life balance. Research organisations need to adapt to the realities of women and family issues.

4. Value all aspects of the academic profession, and do not expect that scholars will excel at everything. A healthy division of labour may be more productive.

5. Ensure academic freedom, and reverse the tendency for increasingly targeted funding programs.

6. Encourage further studies on young scholars throughout the world so that institutions can learn from the best practices in other regions while accounting for various research systems.

Irene Friesenhahn is the project officer for the GloSYS precursor study. She is currently completing a PhD on the social and intellectual organisation of academic disciplines.

Collaboration, Mentorship and Mobility of Young Scientists

Insights from the GloSYS precursor study

Catherine Beaudry

Young scientists face many challenges as they progress though their careers.

The GloSYS precursor study collected a wealth of data on the issues facing young scientists around the world. Here Catherine Beaudry shares some of her insights from an analysis of the data.

During 2013, the GYA interviewed 45 young scholars and surveyed another 650 from various regions of the world as part of the Global State of Young Scientists project in an unprecedented effort to identify the most pressing issues related to a career in research. This article for GYA Connections constitutes a first attempt, after the publication of the preliminary results, to categorize this population according to their workload.

One of the first tasks was to classify the survey respondents in terms of groups or 'clusters' of scientists. To achieve this, I used a single question related to how they perceive their workloads. Respondents were asked to rate their workloads in the areas of teaching, research, administration and services, as well as training and supervision as low (1) to very high (5). From these answers we could identify four classes or 'clusters' of scientists.

The first cluster heavily invests in research but not much else. We would call this group the 'Postdoc or Young Scholar'. The second is composed of the archetypal academic that does every task with a perceived average to high workload, which we classed as the 'Typical Academic'. The third group concentrates its activities on research, training and supervision (Researcher and supervisor), and the fourth focuses almost solely on teaching (Teacher).

The scores and sample sizes for the four clusters of scientists are shown in Table 1. Because of a relatively small sample size for each group, the results have to be analysed in terms of broad tendencies to identify avenues for future research, and not as a definitive answer to the questions asked in the survey.

As a validation of the four categories of scholars identified, we compiled the number of hours devoted to each task, within and outside of term time and found them to be very much in line with the four clusters.

Table 1 – Defining Classes or 'Clusters' of Scientists via survey scores

	postdoc	typical academic	researcher/supervisor	teacher
Sample Size	**62**	**138**	**32**	**68**
Teaching (average score)	1.37	3.11	1.56	3.47
Research	4.60	3.20	4.47	2.75
Admin and services	1.48	3.78	1.78	1.84
Training and supervision	1.55	3.39	4.19	1.53

The next step of the analysis involved comparing the various characteristics within each cluster. Table 2 presents a selected sample of attributes and perceptions for the four clusters. While there is no apparent gender difference between the groups, age discriminates between the older Researcher & Supervisor (average age of 37.7 years) and Typical Academic (35.8 years) groups on the one hand, and the younger Postdoc & Young Scholar (33.3 years) and Teacher (33.5 years) groups on the other hand.

A thorough statistical analysis of the data revealed some obvious trends. How often a respondent participates in local or national collaboration is systematically lower for the Teacher group (2.572) for instance, while the Researchers & supervisors, maybe because of their greater maturity, recognise that a successful career in academia depends on teamwork (4.438).

The Mentorship category measures how often young scientists seek council from a senior colleague or mentor. The responses to this question clearly differentiates between the research oriented scholar groups - the Postdocs (3.205) and Researcher & supervisors (3.202) and the other two clusters. In other words young scholars heavily involved in research generally seek advice for their careers from mentors, superiors and principal investigators of the grant on which they work, and much more so than other groups of scholars.

Another clear trend that emerges relates to international collaboration and mentorship, and clearly identifies the Researcher & supervisor group (3.047) as the one that most often collaborates with colleagues from other countries and seeks mentorship from these colleagues. This group of scholars is also the most mobile, 78.1% having declared to have worked abroad. Amongst the Postdocs and younger researchers working abroad, there is a genuine concern about finding work after the contract ends (2.145). In contrast, for the older Researchers & supervisors, it is being apart from family and friends that is perceived as the most unattractive consequence of mobility (2.741).

Table 2 – Collaboration, mentorship and mobility for each group

	postdoc	typical academic	researcher/ supervisor	teacher
Sample Size	**62**	**138**	**32**	**68**
Female scholars	45.2%	43.8%	62.5%	52.9%
Average Age	33.3	35.8	37.7	33.5
Local and national collaboration (4 point scale)[a]	2.832	2.931	3.047	2.572
Mentorship (4 point scale)[a]	3.205	2.573	3.202	2.628
International collaboration and mentorship (4 point scale)[a]	2.213	2.134	2.635	1.934
Success is dependent on team work (5 point scale)[b]	3.803	3.750	4.438	3.925
Mobility (proportion)	71.0%	56.5%	78.1%	39.7%
Finding work after the contract ends (6 point scale)[c]	2.145	2.690	3.185	2.656
Being apart from family and friends (6 point scale)[c]	3.764	2.969	2.741	2.891

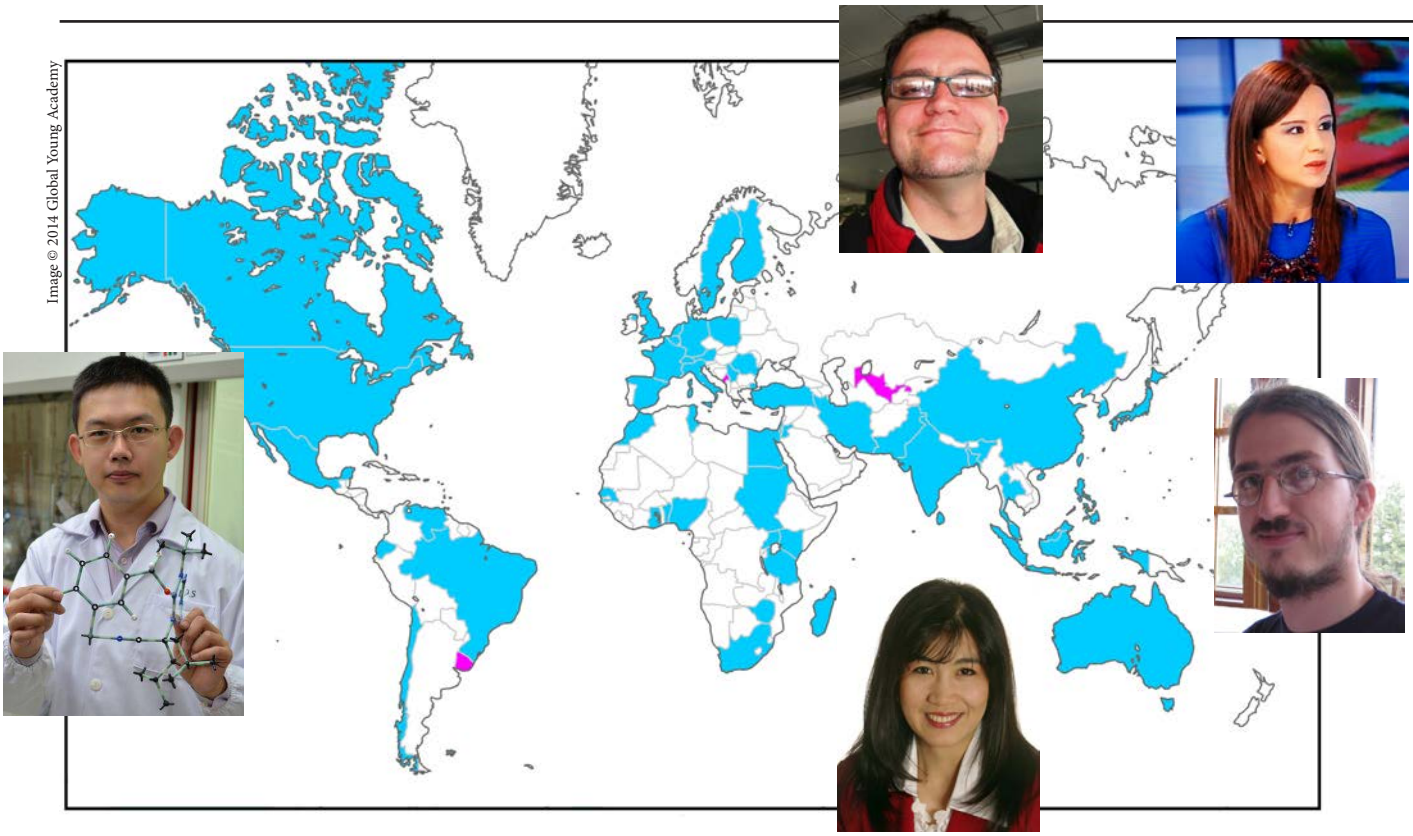
[a]Respondants were asked to score their answers from 1 (never) to 4 (very often).
[b]Respondants were asked to score their answers from 1 (strongly disagree) to 5 (strongly agree).
[c]Respondants were asked to score their answers from 1 (little concern) to 6 (strong concern).

International links may take some time to establish, are hard to maintain, seem to be greatly helped by international mobility, and this may be due to age and maturity of the scholars that compose this group. Because this is a precursor study, there is not enough data to disentangle the effect of age from a pure research oriented effect. This will have to be investigated further in future GloSYS studies. One thing is certain however, the mentorship sought and obtained is definitely more important to research-oriented scholars, if not simply related to research, but we have no means by which to show the latter at present. It is nevertheless interesting that the lack of mentoring is more often perceived as an obstacle to one's career when one is more involved in research endeavours, 47.5% of Postdocs & young scholars, 49.1% of Typical academics and 32% of Researchers & supervisors.

While we have only scratched the surface of the results from this precursor study, what clearly transpires is the wide diversity of researchers that are working throughout the world. It would be a gross mistake to analyse researchers as a homogeneous group of individuals. A common theme to those involved in research is undoubtedly that of collaboration and reaching out to colleagues and mentors whether locally or internationally is an absolute necessity.

Catherine Beaudry is a GYA member and an Associate Professor in the Mathematics and Industrial Engineering Department at Polytechnique Montreal. A version of this article with full details of the statistical analysis is avilable at the GYA website. www.globalyoungacademy.net

GYA new members



Global reach of the GYA. Countries with current members are coloured blue; countries joining the GYA family for the first time are shown in pink. New members shown **(clockwise, from top)**:

Matías Arim **(Uruguay)**
Aneta Spaic **(Montenegro)**
Gonzalo Tornaria **(Uruguay)**
Dilfuza Egamberdieva **(Uzbekistan)**
Jackson Dasheng Leow **(Taiwan)**

What do Singapore, Montenegro, Uruguay and Uzbekistan have in common? In 2014, the GYA welcomed its first members from these countries. Four years after the founding of the GYA in Berlin, this year's new intake of 45 members brings the organization up to full strength for the first time.

Every year, the GYA issues its worldwide call for new applicants, seeking out the best and brightest young researchers around the world. Would-be new members are required to provide extended answers to a series of questions about their research career, contributions to the broader research or academic community, international and interdisciplinary collaborations and motivation for joining the GYA.

As the September closing date nears, the office staff brace themselves to receive a deluge of applications and enquiries from around the globe. This year was no different, with candidates from more than 50 countries ranging from Australia to Zimbabwe applying to join the GYA.

Wading through these applications is a daunting task, involving a panel of more than twenty assessors. Judging starts as soon as applications close and runs over three rounds until the end of the year. It goes without saying that candidates must be amongst the leading scientists, researchers or scholars in their field. However, to be accepted into the GYA, they must also be able to show evidence of delivering impact from their research and making the world a better place.

Judges score each applicant against three factors: traditional academic excellence; engagement with industry, government or society; and demonstration of a passionate commitment to service. Each application is assessed by judges from a diverse range of backgrounds, disciplines and nationalities to ensure a fair evaluation. The strongest candidates are those that can clearly communicate their achievements and abilities to a wide audience.

As the GYA has grown in size and stature, both the quality and diversity of the applications have increased markedly. For the first time this year, more than a quarter of the successful applicants came from outside the science, technology, mathematics and engineering (STEM) disciplines. Their expertise in law, linguistics, economics, theatre and media will add enormously to the vibrancy of the GYA.

In the future, we look forward to continuing to broaden our reach, particularly into central and northern Asia, Eastern Europe, Africa and Central and South America. Whilst the GYA covers a broad range of research disciplines, we are particularly interested in attracting researchers from industry, government and other areas outside of traditional academia.

Outstanding young researchers and scholars interested in applying to join are encouraged to look out for the membership call, released on the GYA website each June. We look forward to welcoming you in the future!

Around the World in 80 Ways: Four Tips for Leading Global Initiatives

Rees Kassen

In four short years the GYA has grown from a well-meaning but impracticable idea hatched over late night discussions at a World Economic Forum meeting, to a vibrant global organisation with 200 members from 58 countries. Leading an international body with a diverse constituency through a period of rapid growth poses exceptional challenges. Here GYA Co-Chair Rees Kassen reflects on the lessons he has learned in the leadership hot seat.

Picture a map of the world. One large enough to walk on. Go to your hometown and place a pin there. Now, identify the locations of where you have conducted research, and where you have collaborators, friends, and relations, and place different coloured pins at each of their locations. Take some string and link everyone together. What do you get?

My bet is that most of us will weave a pretty tangled web. If you were to walk from one end of the map to another, it would be hard not to trip.

Leading change is hard at the best of times, but doing it across different cultures, communication styles, and time zones can be especially challenging. There are just so many opportunities to trip up. Words, for example, can mean different things to people from different parts of the world. The word "science" in North America is usually taken to refer to the natural sciences of biology, chemistry and physics. In continental Europe, however, the word "science" is closer in meaning to its Latin root, *scientia*, or "knowledge," and so is taken to mean any discipline that creates knowledge, whether it be the natural sciences, the social sciences the humanities, or even the arts.

This may seem a trivial example but it can have important implications. I have been involved in the Global Young Academy since its foundation in 2010, an organisation whose primary mission is "to be the voice of young scientists around the world." Obviously, the definition of science is crucial here, because it determines which disciplines will be represented as part of the GYA and on whose behalf the organization speaks. For the record, while there was much debate among the 60 or so individuals at the founding meeting, we settled on the more inclusive definition of science as "knowledge creation."

Definitions aside, my time with the GYA has taught me a lot about working and leading effectively across different cultures. Here are a few of the things I have learned along the way, with the help of a training session in intercultural communication and conflict management provided by Dr. Hanna Milling (you can see examples of her excellent work at www.hannamilling.de.)

1. How you say something matters as much as what you say
North Americans tend to be direct and blunt. We say what we mean, mostly, and we think this is a good thing because it reflects values such as authenticity and openness. However, being too direct can be interpreted by some cultures, in Africa and Asia especially, as being tactless and undiplomatic. Lacking directness, of course, can seem manipulative or fake. Effective cross-cultural communication starts by acknowledging these differences exist and then finds ways to move the conversation beyond them.

2. Listen to what others are saying
It seems trivial but it is remarkably hard to do, especially if you are like me and tend to interject when you come across an idea that is particularly intriguing (I call it building on an idea, my wife calls it interrupting). The thing is, what you find so interesting may not be the message your partner is trying to communicate, so when you interject too much you run the risk of not actually hearing what

> "Navigating the tangled web of intercultural differences that come with working in a global context can be hard and, at times, frustrating. But the pay-off can be great."

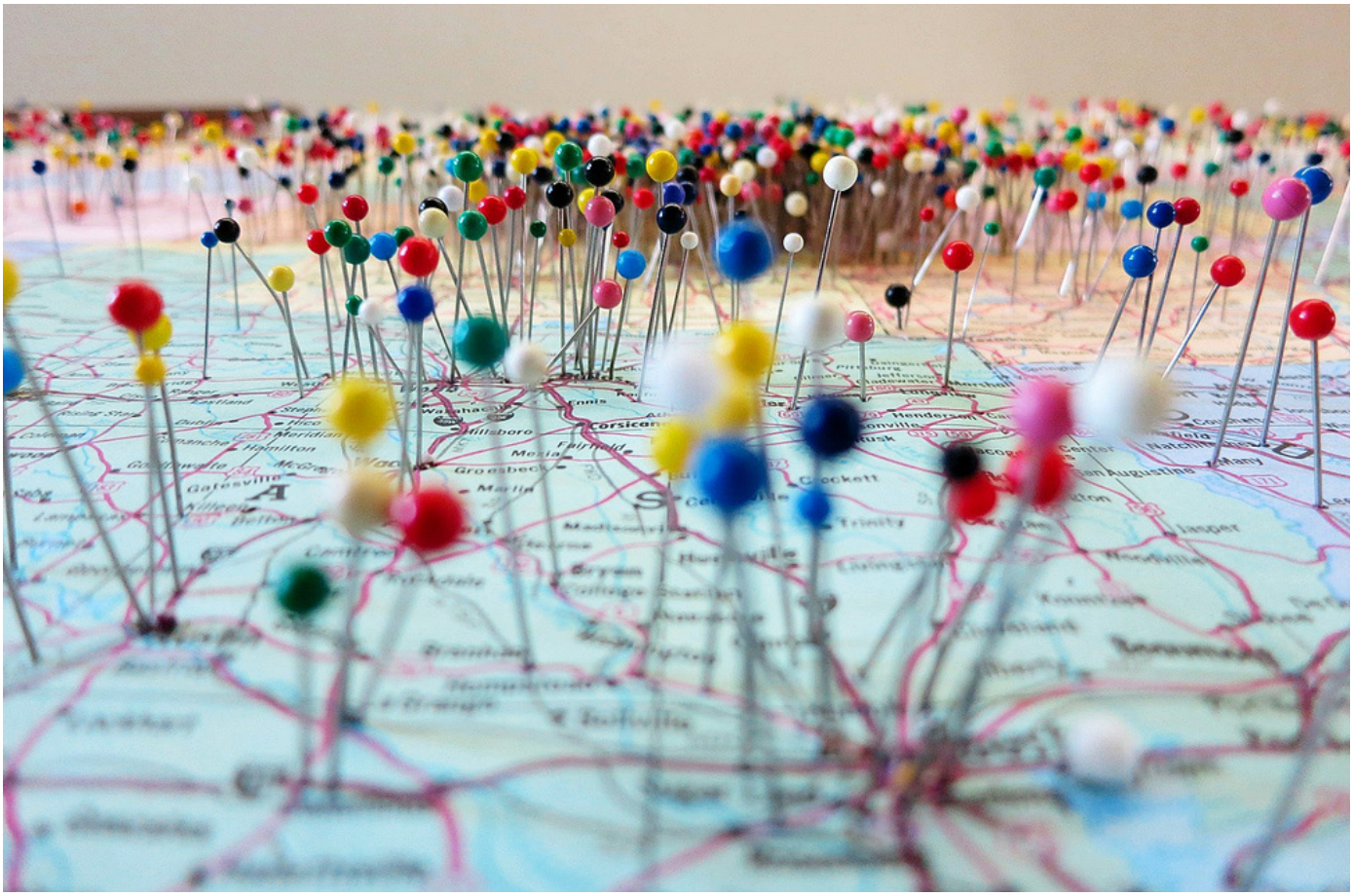


Image Flickr user Dave77459, under Creative Commons license 2014

that person is trying to say. So I am trying to bite my tongue more often and let them say it.

3. Acknowledge that you've been listening

Thank your interlocutor for sharing their thoughts and paraphrase back to them what you heard them say to indicate that you've understood their message. Use phrases like "What I hear you saying is…" or "Is what you meant…."

4. Identify and work towards common goals

There is nothing quite like a common goal (and a deadline) to focus everyone's attention. Identify what you are trying to achieve early on, and spell out the steps needed to get there. You want everyone pulling in the same direction, not going in circles or working at cross-purposes.

Getting to the last point is the most challenging and the most rewarding. One approach we have used at GYA meetings, more by happenstance than any grand design, is to provide a semi-structured opportunity, involving small group discussions and lots of note-taking on white boards, to identify the challenges and obstacles faced by our members in achieving excellence and impact in their work. It takes a few minutes for people to warm up but, when they do, the scene turns into something like the "Airing of the Grievances" (for anyone who watched the 1990s US sitcom Seinfeld, this will bring to mind the Festivus episode). These discussions are valuable because they establish that everybody can, and is expected to, contribute to the organization. New members sense early on that they are among peers with similar concerns and challenges, and so they begin to feel vested in the life of the GYA. However, there is deeper value here: it gets people talking, it gives them an opportunity to be heard, and, more practically, it often identifies a series of cross-cutting issues that we can work on over the next year.

Navigating the tangled web of intercultural differences that come with working in a global context can be hard and, at times, frustrating. But the pay-off can be great. The challenge is to turn the tangled web into a rich tapestry. These four simple tools can, in my experience, go a long way towards improving communication across cultures and building a global team.

Increasingly many young scientists cultivate complex global networks of friends and collaborators

Rees Kassen is Professor and Research Chair in Experimental Evolution at the University of Ottawa and Co-Chair of the Global Young Academy.

email: rees.kassen@uottawa.ca

A version of this piece originally appeared on Stanford University's Leopold Leadership blog.

http://www.stanford.edu/group/leopoldleadership/

NYAs in Nairobi

African Young Acadamies meet in Kenya

Phil Gona and
Michael Sutherland

At left: Images from the NYA meeting in Nairobi

The GYA, in cooperation with the Network of African Science Academies (NASAC), recently organised an exciting meeting of young scientists in Nairobi, Kenya. The conference was centered around supporting and encouraging the burgeoning National Young Academy movement, through recognising the role that NYAs can play in accelerating the expansion of science for development. The meeting brought together representatives of the member academies from the NASAC with all existing NYAs in Africa, as well as representatives from NYA initiatives and other young scientists from countries in the NASAC network.

The opening ceremony was a unique and colorful musical event, with entertainment by the Afro-pop music group Afrizio, who played popular African songs with lyrics artfully customized to the GYA mission statement, much to the delight of the audience. Former Co-Chair Bernard Slippers from South Africa was on hand to help launch the conference. "Young academies are recognized as the most effective tool to give a voice to young scientists in science policy and society more generally" he said, adding that "it is also a launch pad for their development as leaders in science. We have little doubt that this movement will be at the center of the development of science on the African continent over the next couple of decades."

The conference program included sessions on the potential benefits of the NYA movement, and on identifying roadmaps for the establishment of more NYAs in Africa. Other sessions explored science for development in Africa from the perspective of both scientists and funders, with talks looking at the uniquely African challenges for scientific advancement. Like many GYA meetings, small group discussions were an important feature of the event. Groups talked for instance about the recent GloSYS study and how to interpret and build upon the results in an African context, while others considered issues facing the career development of women scientists in Africa.

A highlight of the event was the official launch of the Kenyan National Young Academy, which was helped by GYA member Peter Ngure (see facing page.) In his closing ceremony remarks, the representative for the National Commission for Science, Technology and Innovation in Kenya pledged substantial material and financial support for the newly inaugurated group.

This was the first young academies conference of its kind in Africa, and the delegates enthusiastically agreed to meet again in two years in order to maintain the momentum of the NYA movement in Africa.

GYA Member Profile

Peter Ngure

Daystar University, Kenya

GYA member Peter Ngure talks about the new Kenyan National Young Academy, and his work on parasitology in Africa. He is pictured above distributing mosquito nets to Kenyan families.

My name is Peter Ngure, an Associate Professor of parasitology and entomology and Dean, School of Science of Engineering and Health at Daystar University in Kenya. As a founder member of the GYA I felt compelled to spearhead the establishment of the Kenya National Young Academy of Sciences (KNYAS). This task was challenging considering the fact we worked hard to take advantage of the 1st Africa regional conference of young academies for the launch. I must confess that the senior academy was very supportive in this ventures and provided manpower, space for planning meetings, and the vital networks with government officials. The launch KNYAS on 3rd February 2014 and the hosting of a successful conference, which you can read about in this issue of GYA Connections was rewarding. I have since been admitted as a member of the senior academy and there is a likelihood that I could be requested to become a patron of the young academy. The support of the senior academy in helping get the Kenyan young academy off the ground is an important lesson in cooperation that will be useful for those looking to launch young academies on their home countries.

The GYA has played a critical role in stimulating my career growth. The primary effect has come from the positive interactions with young scientists who have achieved so much. The influence has motivated me to compete for grants and carry out research in vector control, HIV and AIDS control and interrogating social issues such as causes of divorce and separation in Kenya. In the last four years, I have obtained over $500,000 in grants and published 18 papers in peer-reviewed journals. The grants have facilitated the purchase and distribution of 6,000 mosquito nets and the construction of 70 corrugated iron sheet houses to replace stick-walled houses as measures to control the spread of leishmaniasis in the study area.

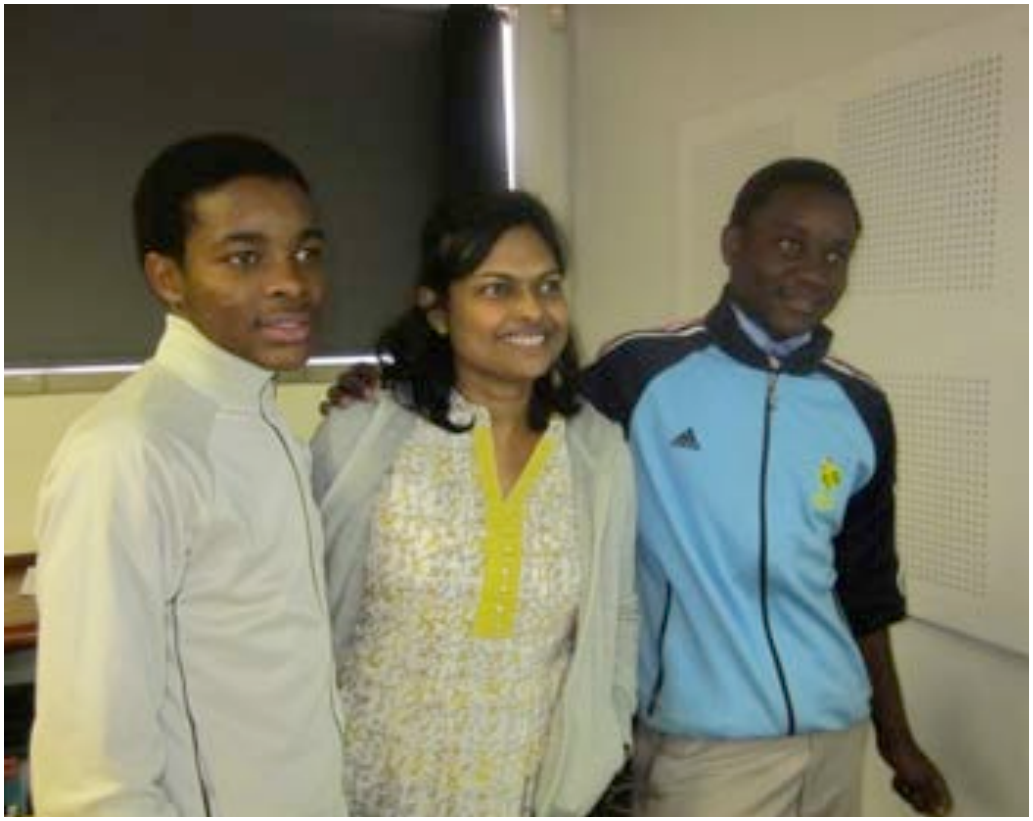
"The GYA has played a critical role in stimulating my career growth. The primary effect has come from the positive interactions with young scientists who have achieved so much. "

I have also spearheaded the establishment of the Private Universities Research Consortium of Kenya (PURCK). Fourteen private universities are on board. We intend to increase the quantity, quality and visibility of research outputs in the private universities in Kenya.

Ranjini Bandyopadhyay

Raman Research Institute, Bangalore

Each issue we profile members of the GYA. Here physicist Ranjini Bandyopadhyay tells us about her hard work on soft materials.



Ranjini Bandyopadhyay with South African school students as part of her outreach activities with the GYA

"Physicists, well known to be a breed apart, often fall prey to a Peter Pan syndrome that drives them to look for new toys to play with, new interlocking pieces of that complex jigsaw puzzle we call reality. So these children who never grew up have come up with a new discipline they call "soft matter physics" and are stubbornly persuaded that the same basic ideas may help us understand how all these things work, from Titian's colors to the organization of life – a life that, according to Shakespeare, is made of the same "stuff that dreams are made of." And what could be softer than a dream?"

-Roberto Piazza in "Soft Matter: The stuff that dreams are made of" (Springer Science, 2011).

In my laboratory at the Raman Research Institute, Bangalore, I am living a dream every day. It is fun doing soft matter physics for a living – what could be better than being paid to watch bubbles of an aqueous foam popping under a microscope, to get a suspension of cornstarch to dance on a mechanical shaker or to segregate a load of mixed nuts by shaking them?

My research interest is in the area of soft condensed matter physics – the science of materials that are complex in their organization and flexible in their mechanical properties. Blood, paint, milk, foam, polymer melts, clay suspensions and soap solutions are some everyday examples. These materials have a very special property – they have relaxation times that are comparable to time scales that are accessible in the laboratory – typically from microseconds to hours or days. The slow timescales characterizing these materials owe their origin to the mesoscopic sizes of the constituent macromolecules.

The relaxation properties of materials can be described by a dimensionless number – the Deborah number De, named after the prophetess of the God of the Israelites. De is the ratio of the characteristic relaxation time of the material and the observation time. When the characteristic relaxation time of a material is shorter than the observation time, the material flows like a liquid. If the observation time is shorter than the material's relaxation time, it behaves like a solid. Solids and liquids are, therefore, the two far ends of the spectrum of

Sticky Situation: The Pitch Drop Experiment

'Panta rhei' or 'everything flows', said Heraclitus (c. 535 – c. 475 BC), the famous Greek philosopher of Ephosis, Ionia in Asia Minor. In other words, a solid can flow like a liquid if the observation time is long enough. A remarkable study that shows that solids are really liquids with very high viscosities (the viscosity of a liquid is a measure of its resistance to flow) is the pitch drop experiment, recognised as the longest-running continuous scientific experiment, started by Professor Thomas Parnell at the University of Queensland, in Brisbane, Australia, in 1927.

Professor Parnell filled a funnel with very hot pitch (also known as bitumen, shown at left) and allowed the material to cool and settle for three years. In 1930, the sealed stem of the funnel was cut. At room temperature, pitch is very brittle, and can be shattered with a hammer blow.

Pitch has been dripping out very, very slowly for the last eighty-four years. Only nine pitch drops have actually formed and detached from the funnel since then, with the latest having detached only in 2013. This experiment shows that the viscosity of pitch at room temperature is a hundred billion times that of water. Solids and liquids are, therefore, the two far ends of the spectrum of materials.

Physicist John Mainstone, who took over the experiment in the 1960s missed all three pitch drops that took place during his custodianship, having watched over it for 50 years.

Mainstone once devoted an entire weekend to watching the pitch in 1977 – but gave up due to exhaustion and missed the event by a day. In 1988, he knew a drop was close, but it happened in the five minutes when he left the room to get a cup of tea. By 2000 Mainstone set up a webcam to capture the event. However, a 20 minute power outage occured at precisely the time when the pitch drop fell. Unfortunately, Mainstone died of a stroke in 2013, a few months before the most recent drop event.

If you fancy yourself luckier than Prof. Mainstone, the next drop is expected in 2027.

materials. Soft materials are those in-between squishy materials that can exhibit both solid-like and liquid-like properties at laboratory timescales.

Unlike atomic solids or liquids, soft materials can be transformed from solids to liquids or vice versa by the action of very small forces. This is because of the weak inter-constituent interactions that exist in these materials.

Soft materials have diverse uses in the bioengineering, pharmaceutical, food and materials processing industries. In the polymer processing industry, for example, it is useful to estimate how to transport polymer melts over long distances with a minimal energy cost. Practitioners of soft matter science use available theoretical and experimental tools to make predictions and provide solutions. Soft materials are also of great interest from the fundamental physics point of view. Because their relaxation processes are much slower than those of atomic solids, they are also often used as model systems to study the behaviour of materials whose dynamics are much too fast or slow to measure in the laboratory.

> "Unlike atomic solids or liquids, soft materials can be transformed from solids to liquids or vice versa by the action of very small forces."

Glasses, a system studied widely by materials scientists, exhibit extremely complicated dynamics. Window glasses, for example comprise a dense random packing of their respective constituents and exhibit two distinct relaxation processes.

Besides being disordered, glasses are also metastable, which gives rise to fascinating time-dependent aging properties. 'Aging' refers to the spontaneous time-evolution of the physical or mechanical properties characterising a material. The relaxation times of the molecules of window glass lie outside the timescale window accessible by standard laboratory tools. In our laboratory at the Raman Research Institute, we engineer the interactions between colloidal particles to make synthetic soft glasses whose structure, dynamics, stability and flow properties can be studied using dynamical light scattering, ultrasound absorption, imaging and flow experiments.

Very recently, we demonstrated several startling similarities between soft clay glasses and supercooled liquids approaching the glass transition. We have also shown in an earlier work that strange properties like strain-induced jamming can exist in these materials.

The Brazil nut effect is a peculiar property of granular media - when a bowl of mixed nuts is shaken, the largest always rises to the top.

Our group also works in the area of designing nanometer size vehicles to carry drugs, and the controlled, targeted delivery of the latter at specific targets. Our recent research shows that drugs can be trapped in the cores of self-assembled copolymer micelles, which are an aggregate of surfactant molecules dispersed in a liquid. These drugs can then be released by appropriately manipulating the solution temperature and pH. We still have to address some issues related to the toxicity and stability of these drug carriers. This requires us to collaborate with pharmacists.

Then there is the table top science. Our recent work tries to understand the Brazil nut effect – a phenomenon in which the biggest nut always comes out on top when a bowl of mixed nuts is shaken vigorously. In this context, we demonstrated the very important role that convection plays in the segregation of vibrated granular media. We also work on interfacial instabilities, falling ball viscometers, the use of additives to change the properties of industrially-relevant materials, etc.

I came back to India from the United States in 2005 to start my own laboratory at the Raman Research Institute. Training young students, teaching courses, and doing my research has been an incredible experience. In 2008, I was nominated by the Indian Academy of Sciences to attend the World Economic Forum's 'Meeting of the Young Champions' in Tianjin, China. The Global Young Academy, of which I am a founder-member, was born out of this event. I have met some really fantastic and talented people at the GYA and have seen this amazing academy go from strength to strength over the past years. As I retire this year, I look forward to continuing mentoring GYA activities that are dear to me – those concerning women in science and science education.

I am very proud of our achievements in these areas.

My years in the GYA have been extraordinary. But if I had to pick the most extraordinary moment, I would, without any hesitation, pick that day just after the 2012 AGM in South Africa when, as a participant in a GYA outreach activity, I gave a lecture-demonstration on soft materials to young and exceptionally enthusiastic learners at the SciBono in Johannesburg. This must have been the most rewarding experience, not just as a GYA member, but in my entire career as a researcher and teacher.

Ranjini Bandyopadhyay
is a GYA member and Associate Professor at the Raman Research Institute (RRI), Bangalore

www.globalyoungacademy.net

GYA member Federico Rosei awarded UNESCO chair

Prof. Federico Rosei is the inaugural holder of the UNESCO Chair MATECSS at INRS.

In April 2014 GYA member Federico Rosei was inaugurated into a prestigious UNESCO endorsed chair in Materials and Technologies for Energy Conversion, Saving and Storage. Housed at Institut National de la Recherche Scientifique (INRS) in Varennes near Montreal (Quebec), Canada, the Chair is leveraging funds for training students from developing countries, and will involve a network of research partner universities in Africa, the Americas and Asia. Here Federico tells Connections about his ambition to partner with developing countries in tackling the sustainable energy challenge.

During my formative pre-teen and adolescent years I grew up in Trieste, city of science and crossroads between Italian, Austrian and Slavic cultures. Being the son of a physicist, I often frequented the International Centre for Theoretical Physics (ICTP, www.ictp.it), a category I UNESCO Centre founded by Abdus Salam in 1964 (Salam was awarded the Nobel Prize in Physics in 1979). Within the ICTP building and the adjoining Parc of Miramare I played hide and seek with the children of other physicists, including Salam's son. The vision of an international centre, as a means to promote education and science among students and scientists from all over the world, readily appealed to me already back then.

Later I completed high school at the United World College (UWC) of the Adriatic in nearby Duino (www.uwcad.it), an international boarding school that hosts about two hundred students coming from over eighty countries worldwide. During those two years we lived and studied together and engaged in social activities in the community. Without a doubt, it was the single most important and influential period of my life.

In many ways, the idea of the UNESCO Chair in Materials and Technologies for Energy Conversion, Saving and Storage (MATECSS) can be traced back to those formative years, to the lifelong friendships I made back then with boys and girls from all over the world. Having grown up in an upper middle class Italian family, I had not fully appreciated the privilege of my condition until I met fellow students who had never experienced so many things that I easily took for granted. Many of my schoolmates had never seen the sea, or had never seen the snow, or had never flown on a plane, or had never had running water at home. Those two years were an incredible

eye opener for me. Many of the friendships have been an important part of my life and still are. And many of the choices I have made, personal and professional, have been influenced by that experience.

Since joining the Institut National de la Recherche Scientifique (INRS) in 2002, I have found myself embedded in a stimulating scientific and cultural environment, surrounded by colleagues and students from all over the world. I had the fortune to supervise and interact with over one hundred trainees at all levels, from twenty-four different countries. This rich diversity eventually became an opportunity to implement the MATECSS vision, which itself is the first step towards a longer, more complex plan for international collaboration and exchanges.

When I was growing up, world crises largely revolved around East/West relations. Yet today more than ever the emphasis of human development, as defined by the Millennium Development Goals, is North/South. Close to 20% of the world's population does not have access to electricity; in sub-Saharan Africa, the number reaches 85% for the rural population [1].

> "Energy is the foundation for any type of development. It is the "golden thread" that connects economics, social equity and environmental issues."

In 2012, which was declared as the Year of Sustainable Energy for All by the United Nations General Assembly, the UN reaffirmed its commitment to increasing access to sustainable energy by declaring 2014-2024 the Decade of Sustainable Energy for All. Implementing the infrastructure for universal access to sustainable energy is a critical scientific and technological challenge, which will require significant capacity building within developing countries. These are some of the reasons why my colleagues and I have partnered to develop the MATECSS concept with our collaborators in the South, to build capacity and create new knowledge in sustainable energy technologies. Energy is the foundation for any type of development. It is the "golden thread" that connects economics, social equity and environmental issues. As such, we hope and expect that in the medium to long term, our efforts will have an impact on education, environment and health in low and middle income countries. Energy technologies are a key instrument of sustainable development and peace-building, and involving emerging countries in MATECSS

The MATECSS chair is a UNESCO sponsored program aimed at making advances in sustainable technologies available to all. The chair includes funding to train young scientists from developing countries in emerging green technologies such as solar cells and other renewables.

will provide an essential synergistic component to the program.

MATECSS aims to address the goal of achieving Sustainable Energy for All though a science-based response built on sharing knowledge on emerging energy technologies. This will be accomplished through a program of visiting professorships, international workshops and student exchanges. In addition, MATECSS will build capacity by training a core group of Ph.D. students from developing countries in Canada (supported by scholarships and tuition waivers) in close partnerships with collaborators in the South, and through the web-based delivery of courses directly to students in developing countries.

MATECSS is conceived to strengthen both North-South and South-South partnerships. We already have confirmed partners in Algeria, China, Costa Rica, India, Mexico, Morocco, Nigeria, South Africa and Vietnam and we are looking for new partners.

The battle against poverty can be won, and science can help.

Emerging technologies have a huge potential to address major societal challenges, including reducing poverty and improving living conditions and quality of life in Low and Middle Income Countries (LMICs) [2,3]. However, it is anticipated that translating advances made in western technology to LMICs would be ineffective and unrealistic [4,5].

Our approach, conceived in consultation with our partners in the South, recognizes that different countries and regions currently have diverse needs in terms of their development potential, so that there is no "one size fits all solution" for addressing energy issues.

In addition, promising new technologies cannot be simply exported to a developing country without ensuring that there is a sufficient "capacity" [4,5], i.e. enough engineers and scientists to convert the energy, sustain its production and distribute it. This global challenge requires resources effective adaptation of technological solutions built from knowledge sharing and capacity building [6]. In this sense it is important to consider that even a small number of highly educated individuals with skills in science and engineering can have a strong impact in their local community and region. This is why the core program of MATECSS is to train a group of motivated PhD students, who can transfer the knowledge and skills they learn during their studies to their country of origin.

"Our approach, conceived in consultation with our partners in the South, recognizes that different countries and regions currently have diverse needs in terms of their development potential, so that there is no 'one size fits all solution' for addressing energy issues."

I heard about the Global Young Academy through a collaborator (who also applied and joined at the same time I did). It was immediately apparent that my personal and professional goals were very well aligned with those of the GYA, so I felt thrilled and honoured to be admitted in this group of young, enthusiastic and committed scholars from all over the world. In many ways the GYA reminds me of the days of high school at the UWC, when I was surrounded by idealistic teenagers from all continents, who wanted to build a better world. The GYA looks a lot like a grown up version of my former school. During the annual meeting in Halle last year I breathed a similar atmosphere of friendliness and excitement about working together. I was also delighted to receive a strong letter of support from GYA Co-Chairs Kassen and Slippers when I submitted the UNESCO Chair application in 2013, and to include the GYA as a partner organization for the Chair's activities. Now that MATECSS is officially launched I hope to foster opportunities for synergy and collaboration with the GYA.

[1] World Energy Outlook 2011, International Energy Agency: http://www.worldenergyoutlook.org/publications/weo-2011/
[2] The War on Want, Editorial, Nature 449, 947 (2007).
[3] Nanotechnology and the Challenge of Clean Water, Editorial, Nature Nanotechnology 2, 661 (2007).
[4] F. Rosei, L. Vayssieres, P. Mensah, 'Materials Science in the developing world: Challenges and perspectives for Africa Advanced Materials 20, 4627–4640 (2008).
[5] M. Chaker, F. Rosei, 'Materials Research in Africa: Rising from the Falls', Nature Materials 11, 187 (2012).
[6] D.A. King, Aid to Enhance Africa's Skills, Science 314, 385 (2006).

2014 GYA events

15-16 May IAP EC Meeting in Rome, Italy.

21-25 May GYA Conference and General Meeting 2014 in Santiago, Chile. Theme of "Natural Resources in a Finite World". Preceded by meeting of Young Academies.

25– 31 May ICSU and the International Social Science Council (ISSC) second young scientist networking conference on 'Ecosystems and Human Wellbeing in the Green Economy' in Italy.

21-26 June GYA Session at the ESOF in Copenhagen, Denmark.

2 July GYA event at the Lindau Nobel Laureates Meeting dedicated to Physiology or Medicine.

15 July Young Academy of Europe Conference in Barcelona.

10-12 September 2014 WEF Young Scientists Forum in China.

19 September GloSYS presentation at the internal meeting of career developers of the big four German research organizations.

26-29 September 2014 Second Entrepreneurship Training Workshop in Yantai, China

September/October GloSYS Africa Preparatory Workshop in Africa.

The Canadian Rockies create a stunning backdrop to a meeting of Global Scholars attended by GYA members.

Global Young Academy
The voice of young scientists around the world

Recent News

Asian Young Scientists Regional Meeting. GYA members recently attended the 1st Regional Meeting of Asian Young Scientists, co-organized by the Science Council of Japan (SCJ) and the National Young Academy of Japan, in Tokyo. The main goal of the meeting was to create a unique opportunity for exchanging ideas, networking and developing purposeful and focused visions among top-notch scientists from Asian Nations. The two-day program included the rich and lively discussions on various challenging topics encountered by Asian scientists and the site visits. There were 21 young scientists from 12 Asian countries namely Bangladesh, China, India, Indonesia, Kazakhstan, Malaysia, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, and Japan. A group picture of the 1st Regional Meeting of Asian Young Scientists with the President (in the middle) and staffs of SCJ The meeting witnessed presentations and discussion on topics such as "Research in Asia: Strengths and Weakness" by GYA member Aftab Ahmad, "Infrastructure for transition to knowledge-based economy in Kazakhstan" by GYA alumnus Kassymkhan Kapparov, "Three Nucleon Forces: Story of old but new nuclear forces" by Kimiko Sekiguchi, and "Advances in Light Microendoscopy" by GYA member Wibool Piyawattanametha.

Perceptions of Research Excellence GYA members Mitsunobu R. Kano, Shoji Komai,Wibool Piyawattanametha and Orakanoke Phanraksa have published a paper resulting from discussion within the "Unleashing Creativity and Curiosity" working group. The paper explores how research excellence is perceived among researchers in Thailand and Japan with an aim to explore whether there are any new indicators that could later be proposed and adopted as criteria of excellence. The article appeared in STI Policy Review, Vol. 4, No 2.

GYA discusses areas of future collaboration with international science organizations In February the GYA - represented by Co-Chair Sameh Soror and Managing Director Heidi Wedel - participated in the first meeting of the leadership from eight international science organizations (IAP, TWAS, ICSU, UNESCO, IAMP, IAC, OWSD and GYA) at the TWAS headquarters in Trieste, Italy, to discuss areas of future collaboration. Following the meeting an action plan, a news story and a declaration will be developed. The meeting was helpful for the GYA to convince the other organizations of our unique potential and to increase our cooperation with them.

Canadian Institute for Advanced Research Current Co-Chair Rees Kassen and immediate past Co-Chair Bernard Slippers attended a meeting of Global Scholars associated with the Canadian Institute for Advanced Research (CIFAR; www.cifar.ca) at the Banff Centre (www.banffcentre.ca) in February. CIFAR is a Canada-based funder of international research networks in focused, programmatic themes such as Cosmology and Gravity, Institutions, Organizations and Growth, and Genetic Networks, among others. Their Global Scholar community is composed of outstanding postdoctoral researchers selected from each of the funded programmes. Rees and Bernard gave a presentation on the GYA and Young Academy movement more broadly, and undertook a number of discussions with the CIFAR and Banff Centre leadership about possible future cooperation (see photo at left).