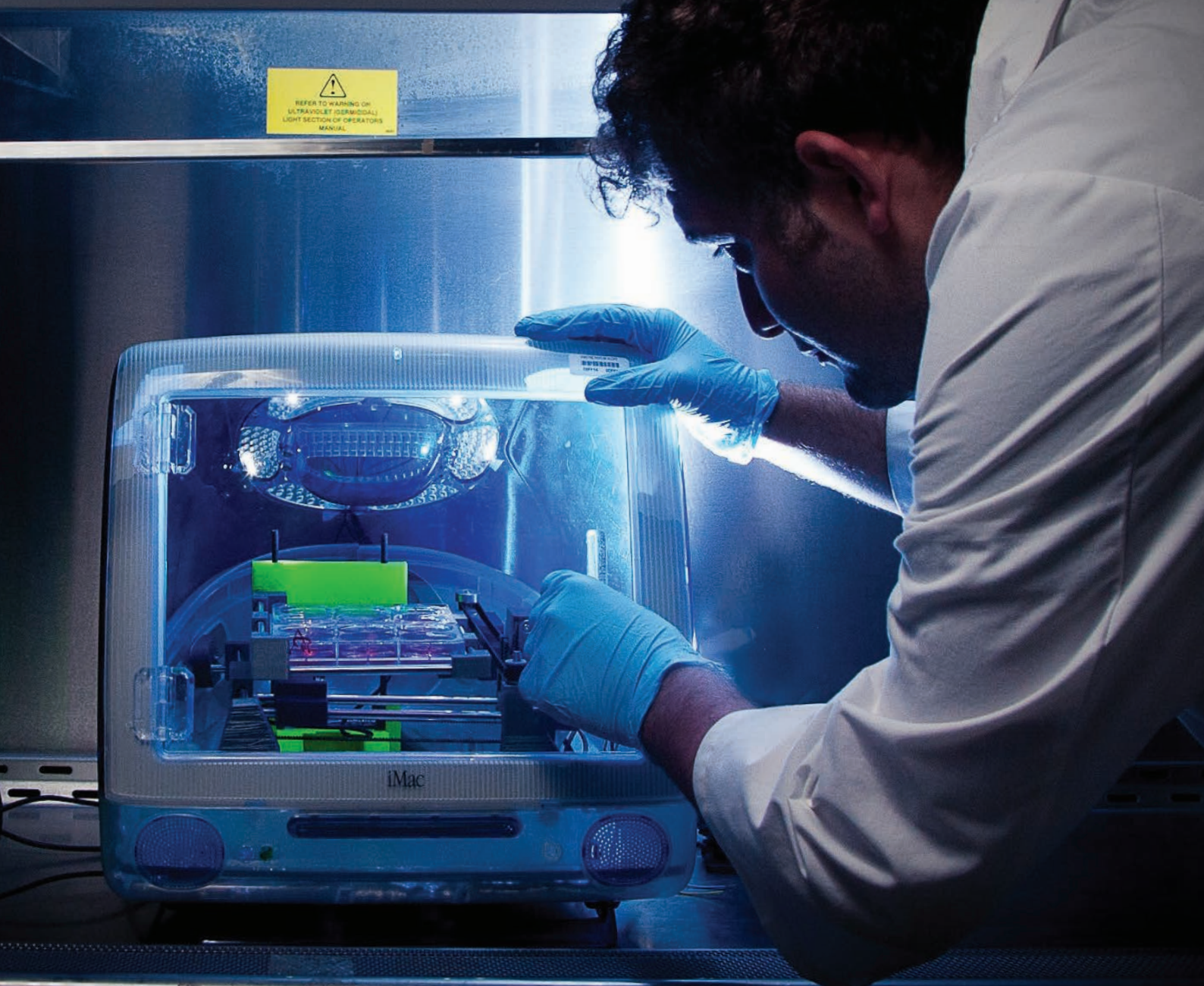


GYA

connections

The magazine of the Global Young Academy



Global Young Academy
The voice of young scientists around the world

2013 GYA General Assembly in Halle, Germany:

"Demography and Global Research"

GYA member profiles:

Andrew Pelling and Jan-Christoph Heiling

The Postdoc Conundrum - avoiding scientific limbo

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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.

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The General Assembly (GA) each year represents a special and unique occasion for the GYA, where most of our members meet to discuss the activities in the previous year and plan the coming one. The GA in Halle (Saale), Germany this year marked a certain 'coming of age' for the GYA. The announcement that the German Ministry of Education and Research would provide stable funding for (initially) the next three years for our office in Berlin was an important milestone in our history. This will enable us to expand our staff and activities, and ensure that the GYA will continue to act as the voice of young scientists around the world.



GYA Co-Chair
Sameh Soror

The General Assembly theme this year was "Demography and Global Research", which included issues such as global mobility and science networking - crucial for the career of young scientists around the world. Several projects were discussed during the meeting aiming at capacity building for young scientists. Self-organized working groups such as "Optimizing Assessment of Excellence" and "Science Engagement" discussed how best to give credit to young scientists who participate in outreach activities and decision making bodies at an early stage of their careers. Other working groups examined projects aimed at bridging the gap between developed and developing countries, such as improving access to research software and science ambassador programs. The meeting also saw discussions of an innovative think-tank model, which aims to open dialogue around societal issues by bringing scientists, industry and government to the table (see *Eva Alisic's* article on page 13 of this issue). I believe that the engagement, enthusiasm and commitment shown by all members during the General Assembly will be the driving force for the success of all these GYA projects.

GYA member Steven Miller takes a photo of a panel discussion at the 2013 General Assembly



photo: Markus Scholz and Global Young Academy © 2013

Cover Photo: Graduate students in GYA member Prof. Andrew Pelling's lab at the University of Ottawa perform an experiment under a fume hood. Andrew's lab specializes in biohacking living cells, and his work is featured in this issue's of *GYA Connections* © 2013 Peter Thornton, University of Ottawa

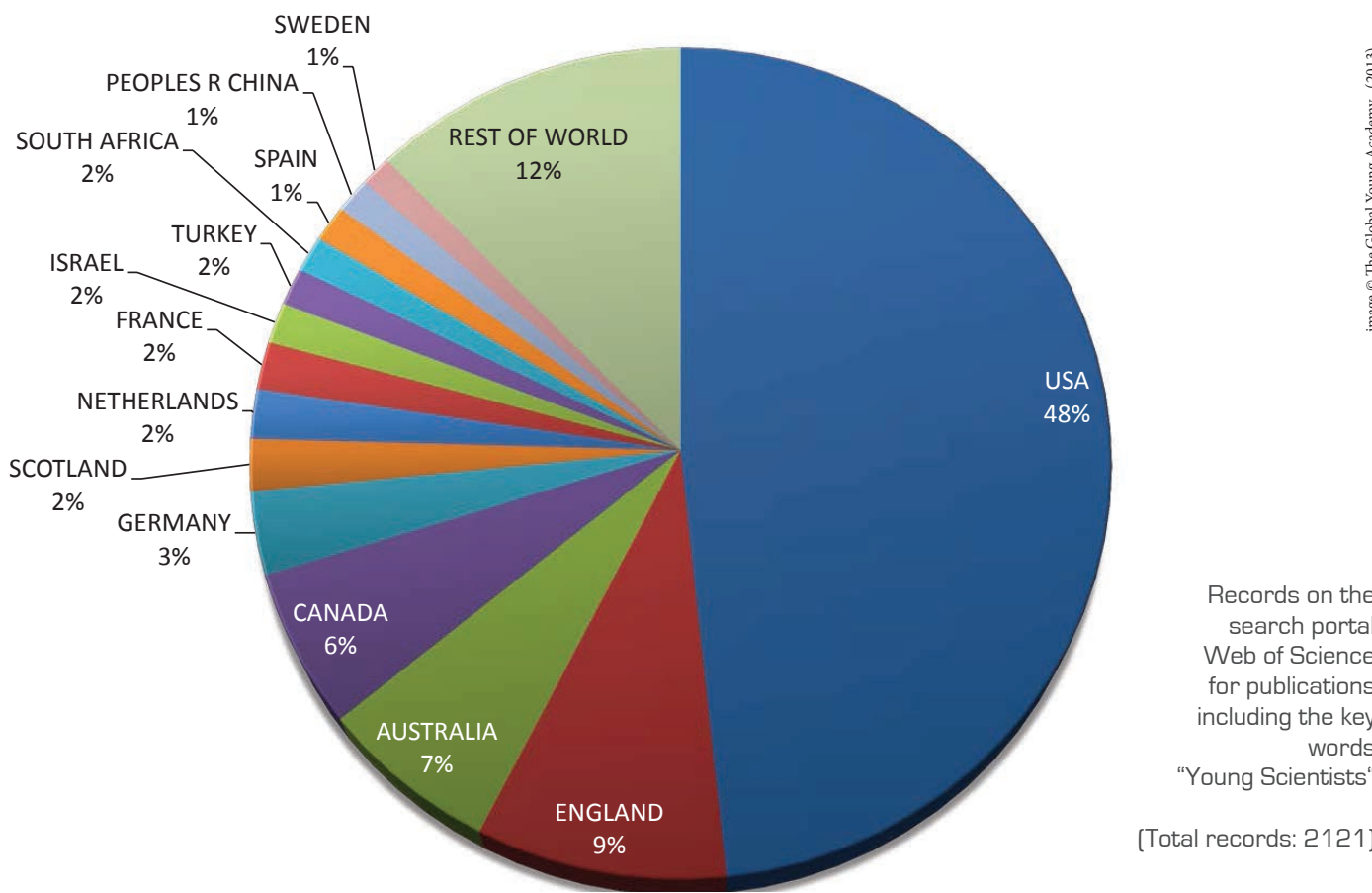


Image © The Global Young Academy (2013)

The GloSYS Project: Assessing the young scientist's career prospects from a global perspective

M. Sutherland and I. Friesenhahn

The Global State of Young Scientists (GloSYS) project is a recently launched multi-year study designed to gather information on career trajectories for young scientists. Coordinated from the GYA office by Irene Friesenhahn, the highly international research team recently held a workshop in Hannover, Germany, to discuss preliminary findings and identify future goals.

Early career researchers have had a tough time of it lately. With many governments entering into a period of fiscal restraint driven by a slump in the global economy, permanent academic jobs are harder to come by than ever. Many young scientists are instead forced into a string of temporary postdoc contracts (see Guru Madhavan's article on page 8 of this

issue). Others who do land a coveted job in a university find it hard to compete for funding in a shrinking pond populated by big fish. Yet speeches by finance ministers the world over invariably point to technology and innovation as engines of future economic growth. Are we jeopardizing this future by losing some of the best and brightest future scientists at the early stages of their careers?

There has been much debate and hand-wringing over these issues. A search on the Web of Science database turns up thousands of articles on the plight of young scientists, yet an important piece of the puzzle is missing. The chart above shows that most of the discussion revolves around scientists from the developed world, particularly the US. With the mobility of young scientists

rising sharply, and the swelling of scientific output from developing countries, surely the global research landscape in a few decades time will have a much more international balance than it does today.

The conclusion is that a true snapshot of the state of young scientists must capture information from those in the developing world. This is one of the key goals of the of GloSYS project, which aims to broaden the discussion of scientific careers by interviewing scientists from several countries on all continents. The findings, due later this year 2013 may help guide the creation of policies that encourage scientific talent at the most precarious stage of their career.

You can out more about the GloSYS project by visiting the GYA website: <http://globalyoungacademy.net>

The Changing Demography of Talent

M. Sutherland and R. Jenkins

The **2013 GYA General Assembly** brought together young and established scientists from around the world to discuss topics around the theme of demography and global research. Featuring high profile guest speakers, new projects and a welcome announcement of funding with big implications for the organisation. Here's what happened.

Demography – the statistical study of human populations – is the starting point in developing plans for the future. For scientists, anticipating demographic change is the key to understanding how scientific research and international collaborations will be conducted in decades to come, and as such is highly relevant for early career researchers. Anticipating future trends in research could pay huge dividends in the form of research opportunities.

The overarching themes in demography are probably clear even to the

non-expert. There is stabilization of population levels in most countries with developed economies, but a steady increase in population in many whose economies are still maturing. Coupled with this is a rapid growth in wealth among the likes of China, Brazil and parts of Africa. These trends will profoundly impact the global research landscape within the next few decades and raise many questions. Could China or India eventually outstrip Europe and the US in terms of the number of scientific papers published? When a developing country becomes developed, will its scientists still choose to collaborate with

the established scientific powers, or build up collaborative networks of their own? Will the flow of highly talented researchers from developing to developed countries stop, and perhaps eventually reverse? The only clear thing is that the way international science is done will be very different in 30 years time.

With these issues in mind, the Global Young Academy (GYA) organized its third annual General Assembly (GA) around the theme of 'Demography and Global Research'. The GA took place over four days in May in Halle, Germany in the German National Academy of Sciences Leopoldina - the newly renovated 'White House of Science' in Germany. The program encompassed issues such as large multi-investigator research groups, international science networks, and global mobility. The highly international character that has come to be a signature of these meetings was evident by the diverse collection of participants, with 78 GYA members from 37 countries joined by distinguished members of the advisory board, and senior science ambassadors from around the world.

Keynote addresses began with Prof. Lee Berger of the University of Witwatersrand, who presented



photo: Markus Scholz and Global Young Academy © 2013

an inspiring vision of globalized research, illustrated with success stories and cautionary tales from his own adventures in palaeoanthropology. Prof. Berger portrayed a world at a historic turning point, with communication technologies enabling collaborative ventures that were unimaginable a generation ago, and traditional geographical boundaries imposing fewer constraints. He urged young scientists and the GYA to practise foresight and leadership in shaping the future of globalized science. This call to arms found resonance in subsequent working group activities, many of which took up themes of the address - notably the current state of young scientists, and the transformative potential of new technologies.

Thomas Sattelberger, former human resources director of Deutsche Telekom, provided an industrial perspective on the flow of scientific talent. He underscored the importance of strong science-industry links in an innovation economy, and observed that talent is nowadays more critical than capital to a company's success. The resulting

dynamic of supply and demand creates migration patterns that must be carefully managed if potential benefits to individuals, institutions, and nations are to be optimised. Mr. Sattelberger highlighted several successful initiatives at Deutsche Telekom - recruitment of new graduates, training of existing employees, flexible working conditions, intergenerational teams - all of which are premised on inclusivity and investment in the full diversity of talent.

The final and perhaps most anticipated keynote address was given

"The launch of the Global Young Academy in 2010 produced something completely new – instilling a breath of fresh air into the global network of outstanding researchers."

German State Secretary Quennet-Thielen

by State Secretary Quennet-Thielen of the German Federal Ministry of

Education and Research (see next page). She reviewed the first few years of the GYA from the Ministry's perspective, and reflected on the achievements of the GYA since its inception - assisting in founding NYAs in several countries, establishing ties between developing and developed countries, advancing science policy recommendations.

The warmest applause however was saved for the part of her address where she announced that the Ministry of Education and Research would fund the GYA office for an initial period of three years. This core-funding follows seed funding provided by the Volkswagen Foundation, and will see a new and exciting phase of expansion of GYA activities. This announcement can be viewed as an endorsement at the highest levels of the GYA's ambition to be the international voice of young scientists. Responding to the announcement, GYA co-chair Rees Kassen called upon GYA members, alumni, and partners, to view these new funds as "an investment in you as the next generation of leaders in global research."

Delegates at the meeting stand in front of the newly renovated Leopoldina in Halle, Germany

From left: GYA members Sabina Leonelli, Guruprasad Madhavan and Vanny Narita participate in a panel discussion on the state of young scientists in different world regions.



photo: Markus Scholz and Global Young Academy © 2013

Towards a Global Research Culture

GYA Position Statement

(cont. from page 5)

In addition to new funds the GA saw new faces and the launch of new initiatives. A total of 43 new members were inducted, and several new working groups were proposed to extend the existing range of GYA activities. Among the new projects are Measuring Excellence in Science Engagement (MESE) headed by Kai Chan, which seeks to develop quantitative assessments of outreach activities, and Think Tank headed by Eva Alisic which aims to bring together representatives from academic, business, and public sectors to examine risk from a multidisciplinary perspective. The GYA leadership was also renewed - a new executive committee was chosen, and Egyptian biochemist Sameh Soror was elected as Co-Chair, replacing the outgoing Co-Chair Bernard Slippers from South Africa.

Discussions around the theme of the meeting distilled into a position statement created by GYA members titled "Towards a Global Research Culture". The statement, reprinted at right, calls for the removal of regional and social disparities in the scientific establishment by following a course of action centred on three main principles: inclusivity, capacity building and sustainability.

There are concrete steps scientific organisations can make to accomplish these goals. Inclusivity and capacity building can be achieved for instance by integrating developing countries into 'big science' projects such as South Africa in the Square Kilometre Array Initiative, and working with publishers to ensure a fair access scheme for scientists. Sustainability is helped by ensuring a steady supply of the best research scientists through improved career planning, and getting young scientists involved in planning and policy decisions from an early state in their careers.

Following the General Assembly of the Global Young Academy (GYA) in May 2013, members identified three key challenges – inclusivity, capacity building and sustainability – standing as barriers to achieving a truly global and open research culture. This statement discusses these challenges and ways to confront them in the future.

At the heart of the scientific enterprise lies a set of core values including equality, equal opportunity, and inclusivity that, together, allow the scientific process to work most effectively. Efforts to support and promote these values have proven challenging and, at times, controversial in the face of the economic disparities among nations and enduring discrimination against specific groups. There remain major imbalances in the distribution of education, infrastructure, and support for science across countries around the world. This is most starkly seen in the divide between the developed and the developing world, where the bulk of scientific training, output, and funding flow from the former to the latter.

These disparities have started to shrink over the last thirty years, thanks to five major developments that signal an expansion in the global reach of scientific research:

- (1) increasing numbers of individuals, institutions and stakeholders are involved in scientific research and diplomacy;
- (2) projects and outputs are more geographically distributed through the establishment of multinational networks and the rise of centers of excellence in the global south;
- (3) standards for science training, recruitment and promotion are increasingly transparent;
- (4) new information and communication technologies, particularly those devoted to data generation and sharing, support rapid communication and international collaborations; and
- (5) open access to publications and data, increasingly promoted by governmental policies, facilitates participation in research and fairness in publication and credit mechanisms.

At the General Assembly held in May 2013 at the German National Academy of Sciences Leopoldina, GYA members discussed these developments and agreed that, encouraging as they are, they do not guarantee that science functions as a truly global endeavour. Effort is still required from both scientific and policy organizations to identify key remaining obstacles to the development of excellent research and widespread education around the world, and find ways to overcome them. Young Academies around the world have a crucial role to play in this effort as they provide the emerging generation of scientific leaders a forum to articulate what they

see as the main challenges of current research and participate in shaping policy landscapes. Members of Young Academies are also the first generation of researchers to experience the institutional, technological, and demographic shifts identified above as integral parts of their training and career paths, and their viewpoint needs to be considered as complementary to the views of Senior Academies. The GYA, comprising emerging scientific leaders from 55 countries around the world, is particularly well positioned to provide a unique perspective on efforts to achieve a truly global research enterprise.

GYA members have identified and discussed three key challenges to achieving a global research agenda. The first is inclusivity in the global research enterprise. Despite welcome advances such as the inclusion of South Africa in the Square Kilometer Array initiative, developing countries remain largely excluded from

"At a time when financial constraints are pushing governments to cut science funding, early career researchers end up being the most vulnerable workforce in the research enterprise."

the development and implementation of key scientific endeavours. The GYA encourages efforts to integrate developing countries directly into 'big science' projects, which increases the scope for training new talent as well as the means available to researchers in those countries. Further, inclusivity is compromised by discrimination in terms of seniority, gender, religion, ethnicity and location. Such discrimination strongly impacts hiring, promotion and publication practices. The GYA proposes that discrimination can be countered via increased transparency in the criteria and practices used to foster career paths in academia; the streamlining of funding applications, which will make it easier for talented individuals with family responsibilities and/or limited research time to ask for support; and the implementation of gender shares on scientific committees and panels, so as to facilitate the inclusion of women in decision-making processes across the globe.

The second challenge concerns capacity building in science. Despite the recent emphasis on openness and data

sharing, vast disparities remain in publication regimes, credit structures, access to relevant technologies and the provision of key infrastructures across different nations. Such barriers, due partly but not exclusively to economic conditions, must wherever possible be removed, particularly in terms of access to research and knowledge; and the steps taken to remove them should be sustainable in the long term. The GYA recommends that Open Science be promoted in terms of access to data, rights to re-use and access to resources required for reproducing the results. This means fostering cross-national collaborations around research infrastructures and tools, rather than solely around research outputs, so as to support capacity building in developing countries with little to no extra-cost. Increased support for research visits across nations, and particularly south-south collaboration, is another way to enhance the use of existing resources, so that countries where investment in capital equipment is still minimal can benefit from the efforts of others.

The third challenge is that of sustainability in the career trajectories of researchers. Current disparities in the financial, political and cultural support for science across countries are hampering the labour market for science and engineering. At a time when financial constraints are pushing governments to cut science funding, early career researchers end up being the most vulnerable workforce in the research enterprise. The average age for early career investigators in securing their first independent grant award is increasing; and increasingly high numbers of postdoctoral researchers compete for few academic positions. The GYA recommends that research careers outside academia should be promoted as options for early stage researchers, so as to increase employability and promote interactions between science and society. One way to do this is to involve young scientists in policy discussions, as promoted for instance by National Young Academies (NYAs); to this end, the GYA recommends that NYAs be established in every country.

This statement was prepared by GYA members Sabina Leonelli (UK), Guruprasad Madhavan (USA/IN), Abdullah Shams Bin Tariq (BD), Rees Kassen (CA), Rob Jenkins (UK), Sameh H. Soror (EG) and Arianna Betti (NL) and approved by the GYA EC in October 2013.

German State Secretary Quennet-

Thank you for the invitation to your annual conference. It is a great pleasure for me to be here. I am most curious to hear about your work. After all, the launch of the Global Young Academy in 2010 produced something completely new – instilling a breath of fresh air into the global network of outstanding researchers. It is already clear today that the GYA was not just a storm in a teacup or a squall that passes over as quickly as it arises but a constant wind that brings lasting changes.

When the GYA was founded in 2010 there was no international academy for excellent and committed young scientists. The number of national organizations was almost negligible with just five Young Academies. Three years later, 155 young scientists from 55 countries are now members of the Global

Young Academy and it already has 63 Alumni. What is more, the GYA has contributed to the foundation of Young Academies in various countries. You are establishing ties between western industrial nations and emerging countries. And from the very beginning you have taken the line of issuing scientific and science-policy recommendations.

It is only natural and right that you have done so in order to make yourselves heard. At the same time, you are members of a new generation – a generation whose key concern is to pass on scientific know-how. You raised this issue in the “Sandton Declaration on Sustainability”, with which you called upon young scientists to seek the dialogue with society and to exert their influence on political agenda-setting.

Mobilizing scientific knowledge is a

and solve pressing issues. We are always saying that we cannot tackle challenges as climate change, information security or demographic change on a national basis alone – or in many cases even on a continental basis. We must tackle these questions globally – and the Global Young Academy has been helping us to do so since 2010.

Your strong commitment and success have brought you respect and support. The International Academy Panel and the Academy of Sciences for the developing world have provided you with both moral and monetary support. The Leopoldina has agreed to become the administrative seat of the GYA¹. Thank you very much for this offer, Professor Hacker! The Berlin-Brandenburg Academy of Sciences and Humanities is providing the GYA with office accommodation. Thank you, Professor Stock!

I would now like to inform you that my ministry, the Ministry of Education and Research, will provide funding for the administrative office of the Global Young Academy for an initial period of three years and I would very much welcome a contribution from Saxony-Anhalt too. I hope that the office of the Global Young Academy will become the centre of an emerging international young academy movement that attracts and supports young scientists from all over the world.

We are meeting here in Halle today to discuss two topics: Demographic change as a global challenge, on the one hand, and worldwide working conditions for young scientists, on the other.

The Leopoldina, one of the oldest academies in the world, is located here in Halle. A lot of things have

key issue: On the one hand, science depends on public acceptance – and to gain this acceptance it must enter into a dialogue with the public; on the other hand, we – both the public and policy-makers – need science to understand our complex world



From left: State Secretary Quennet-Thielen, BBAW President Stock and GYA Co-Chairs Bernard Slippers and Rees Kassen listen to talks at the GYA General Assembly meeting.

Thielen's Keynote Address

17 May 2013 Halle, Germany [abridged]

changed since its foundation, but the ideas of the academy, the holistic approach to problems and the necessary transmission of knowledge persist – what is more, they have been given new life and have gained fresh importance in recent years.

This applies especially to the issue of demographic change. I am not telling you a secret when I say that for many years Germany ignored questions regarding the causes and effects of demographic change and possible political and societal answers. This was despite the fact that Germany is one of the countries most affected by an ageing population and an extremely low birthrate.

But these days are over. The Federal Government has developed a Demographic Strategy and the day before yesterday, Chancellor Angela Merkel presided over the second Demography Summit in Berlin where political and social stakeholders presented the results of a one-year dialogue. Among other things, the focus is on the future of the family, of learning, of rural areas, of our prosperity and of the ability of the state to act. Some people may call for more concrete measures or perhaps believe that certain topics have not received sufficient attention. But one thing is clear: The Federal Government and the Länder are tackling a development which is leading to a situation where we in Germany are becoming older, fewer and more diverse.

My ministry is playing an active role in the process of discussion and action. Each year we focus on a different scientific issue. This year it is the “Demographic Opportunity” – and I am delighted

that the GYA is one of our partners for this Science Year 2013. You will not therefore be surprised by the term “opportunity” in this context. It is our aim not to merely experience change but to actively shape it. This isn't a euphemism but a necessary change of perspective.

Here too, we must shape the change. But we can only shape it if we have the necessary knowledge. This is why we need you, the scientists. We need your expertise and an international comparison – and, of course, we need a debate about what is appropriate on a global scale and what on a regional scale. Indeed not all societies are becoming fewer, older and more diverse.

We need science and science needs good working conditions. We will talk about this in more detail in the course of the day. But just so much for now: My ministry has introduced many different measures to promote young scientists and improve their working conditions, both national and international. This work is bearing fruit: Germany has become more attractive for excellent scientists over the last few years. Year for year, tens of thousands of scholarships holders from the emergent nations are coming to Germany to study and conduct research. Hundreds of research projects are supported by various funding agencies such as the German Academic Exchange Service, the Alexander von Humboldt Foundation, the German Research Foundation and others.

The GYA for its part claims to be “the voice of young scientists around the world” and as such “to empower and mobilize young



scientists in their creative prime to address issues of particular importance to early career scientists”. You are taking up the situation of young scientists worldwide in the GloSYS study, which is financed by my ministry. I look forward to seeing the results.

“In 1720, the famous philosopher and chancellor of the university of Halle, Christian Wolff published a treatise entitled: “Rational thoughts on God, the world and the soul of human beings; also all things in general” and another one in 1721 entitled: “Rational thoughts on the social life of man”. This seems fairly ambitious to us today. But on the other hand, we too must learn anew to think and discuss more holistically in this world of global connections and problems. I very much hope that we will all have lots of “rational thoughts” on “the social life of man” in particular – and good ideas for making them comprehensible and useful for a larger public. Thank you.

State Secretary Cornelia Quennet-Thielen addressing the GA General Assembly.

photo: Markus Scholz and Global Young Academy © 2013

The Postdoc Conundrum

Avoiding scientific limbo

Guru Madhavan



image: CCCC MS 20, f.66r, used by kind permission of The Master and Fellows of Corpus Christi College, Cambridge

Medieval Christian theologians speculated that the afterlife must include a place for those not deserving admission to heaven but not guilty of behaviour that would condemn them to hell. They called it limbo. In scientific research too, we have a limbo. It contains a large number of highly trained minds in their years of peak productivity but who are not yet considered ready for a faculty position. It's called "the postdoc."

A postdoc is not a clearly defined academic status or job title—but it is generally accepted to be a temporary appointment for gaining additional skills and experience beyond a doctoral degree. However, there's no consensus on how long

the time period could or should be. Academics argue that the time depends on the field of research and the motivation of the individual postdoctoral researcher. Sometimes that "temporary" period can span up to a decade over multiple instalments in multiple labs or research specialties. That state is a "super postdoc"—though there is nothing super about it.

Burgeoning Postdoc Numbers

In the United States, for example, the number of scientists and engineers in postdoctoral appointments (or postdoctoral fellows, trainees, research scientists, associates—the names for this position are legion) has sky rocketed in recent years. The best estimates suggest total numbers between 50,000 and

100,000, with over sixty percent of those being citizens of other countries. A large majority of those scholars are in the biomedical sciences, with engineering and related interdisciplinary research areas also seeing a rising number of postdocs in recent times.

Several specific factors are thought to explain this burgeoning population. The difficulty of publishing in certain research specialties for instance, or the shrinking success rates for research proposals and the limited number of tenure-track faculty openings at top universities. However some observers attribute it to more systemic issues: a wobbly, ill-defined labour market for scientists and engineers shaken by the recent financial crisis or the

The postdoctoral years are often amongst the most difficult in a scientific career.

antiquated structure of an academic system, which now includes aging faculty members who are postponing their retirements.

The benefits of postdoctoral training are thought to be self-evident—intellectual growth, professional maturity, and the development of a research network. But under the surface lurks a different reality. For years many postdoctoral scholars have felt like being treated like second class citizens. Some might even call them the invisible members of the scientific community.

Perspectives from Current Postdocs

Consider views on the postdoctoral system from those who have had first-hand experience with it. A recently graduated elementary particle physicist notes: "The low pay scale is extremely demoralizing: low salary, no health insurance, no retirement fund; moving to private industry would double my earnings...I expect that within two years I will be forced to leave my field (after six years of graduate training) and become a full-time computer hack in order to allow my wife and me to be able to afford to have children." And this from a recent solid state physics graduate who abandoned the research area for an industry position adds: "Postdocs seem to be a 'holding pattern' in most Ph.D.'s careers, judging from my associates' experiences, wherein one trades peak earning years (already substantially deferred) for a low salary, ill-defined working conditions, and no accrued benefits after a one or two year stint."

In my own line of studies—engineering—one faculty member seeking to hire postdocs said: "At present... the pay for postdocs is so low that it is very difficult to find American citizen engineering candidates. Most (if not all) the candidates who applied my two postdoctoral positions were of foreign origin and citizenship...At least in engineering I think we have the makings of a future crisis."

A sociology postdoc at a leading program observes: "...I took this research position because it was a unique opportunity to work with special people. But now, two years later, the job market in my field has collapsed. Though I have been very productive in terms of publications, etc., I have no idea what the future will bring at this point. I've talked to many other young, productive sociologists about these issues lately, and the level of stress and anger is alarming."

"For years many postdoctoral scholars have felt treated like second class citizens. Some might even call them the invisible members of the scientific community."

And finally, as an astronomer notes, the postdoctoral positions have in "many instances been transformed from a temporary educational/maturing experience into a semi-permanent holding pattern permitting a denial of employment realities and a kind of 'futures' speculation against an improbable massive increase in demand for academic faculty. For all too many people whom I know personally, the speculation failed and the chain of postdoctorals ended with financial exhaustion, and under- or unemployment."

Raw, astute, and as contemporary as they may sound, these perspectives are taken from a sweeping multi-disciplinary survey conducted by the National Research Council four decades ago that was part of the 1981 report *Postdoctoral Appointments and Disappointments* (National Academy Press). These issues are now well known, but the challenge is not much

is being done about them in a systematic manner.

Over the past decade, some of the issues—offering health insurance, establishing university offices for postdoctoral affairs, and providing various forms of assistance to scholars on temporary visas in the United States—have already gained traction and support. Membership organizations such as the National Postdoctoral Association in the United States and the UK Research Staff Association have also come into existence to make a better case for postdoctoral scholars. These are encouraging steps.

Root Questions

But they don't begin to cover the root questions that may underpin the agonies of postdoctoral researchers. We must ask: What is the purpose of higher education? What is the purpose of additional training? What is the desired and practical length for each or both of them? What drives the multi-year, multi-institution, multi-field, and multi-publication postdocs for coveted entry level tenure-track positions? Why prepare a host of overqualified individuals for a very limited number of faculty positions? Why pay them so little for their advanced qualifications? Is the change difficult to make because there are no incentives in place for the mentors and institutions hosting the postdoctoral scholars? There are no simple answers to these questions.

Instead of tackling some of these core issues, what we have instead developed are some escape mechanisms. In my experience, one way to shy away from offering policy solutions is to call for more data collection. In fact, one of the four recommendations of the 1981 report mentioned earlier was to focus on data gathering. A number of more recent reports issued by the National Institutes of Health, White House Office of Science and Technology Policy, and the American Chemical Society



Graduate students performing experiments in Andrew Pelling's lab at the University of Ottawa. To avoid the 'postdoc trap', they would be advised to look towards a portfolio approach to career development.

among others have followed suit. Lack of quality data will be a perpetual concern. As long as the world of the public policy exists, it's a good bet that we will continue to come across reports calling for more or better data collection.

My view is that better data would be desirable, but surely most researchers are already aware that there are serious issues with the postdoctoral system. The morale of our highly valuable postdoctoral scientists and engineers—and by extension the vitality of the scientific enterprise—is at stake here.

Support for Career Development
One way to approach this challenge would be to go beyond our bunker mentality and take a portfolio approach toward enhancing the careers of doctoral and postdoctoral-level scholars. In other words, the focus needs to be on a cornucopia of different career pathways that exists beyond the towers of academia. Some like to refer to academia (and occasionally industry) as “traditional” pathways whereas others such as creative arts, journalism, policy, law, finance, consulting, marketing and

fashion design as the “alternative” pathways.

This is a flawed approach, and one of which I'm guilty. I classified careers as “traditional” and “alternative” in my co-edited book *Career Development in Bioengineering and Biotechnology* (Springer), which I worked on as a graduate student. This confession aside, the essence and intent of that book was to promote a portfolio approach to career development with the understanding that many career pathways are equally valuable and legitimate for a scientifically-based mind. In fact, the current reality is that academia is becoming the “alternative” career pathway as ever more PhDs and postdocs pursue non-academic careers. And this has advantages. Only by encouraging the spread of scientists and engineers through different career channels to the various corners of our society can we become better designers and communicators of our profession in the future.

Career development of scientists and engineers across different sectors needs to be given greater weight and recognition in our

scientific culture. Awareness of the portfolio of career pathways available for scientists and engineers needs to begin as early as undergraduate years, perhaps even during high school years, via counselling, publications, symposia, social media, online courses, professional societies, and both young and senior national scientific academies. The pursuit of doctoral degrees and postdoctoral experience needs to be critically evaluated by aspirants before important life-altering decisions are made. Advanced degree or training is not for everyone, and not every career pathway requires one.

Calling for a culture change or a structural reform in the scientific enterprise is easier said than done. To re-engineer the postdoctoral research system—with the ultimate goal of redesigning the academic research system—we first need to change ourselves. We also need to update our understanding of current social, economic, and labour market conditions. The early career scientists and engineers—and young national academies—can help propel these discussions, and need to take responsibility for leading this change. By ignoring these realities we remain prisoners of our tradition.

The alternative? There's always limbo.

Guru Madhavan is a biomedical engineer and founding member of the GYA. The views expressed in this article are in his personal capacity.

Twitter:
@BioengineerGM



Andrew Pelling University of Ottawa

Each issue we profile members of the GYA. Here biophysicist **Andrew Pelling** tells us about collaborating with artists and using artificial physical signals to “biohack” living cells.



In 2008, I opened my lab at the University of Ottawa with the goal of bringing together a smart, enthusiastic and hard working team of people to simply ask questions, without regard to boundaries associated with scientific disciplines, industrial applications or economic value. ‘Curiosity’, given its intrinsic value, would be the engine of my laboratory. Five years later, I now lead a group of about 15 people from numerous academic backgrounds. This summer we are even hosting two artists-in-residence who are participating fully in the creation of new scientific knowledge and pursuing their own practices and interests.

On paper I am a chemist, a physics department hired me and I lead what is essentially a cell biology laboratory. The cells in our bodies are constantly subjected to mechanical forces that affect our health and

well-being - forces that emanate from many places, including the movement of our muscles, organs and blood. Importantly, these physical cues directly influence normal processes in our bodies, such as stem cell differentiation, muscle regeneration, cell growth and even cell death. In some diseases, cells often lose their ability to sense and respond to physical cues and the ability to regulate their own physical properties. However, it is still poorly understood how cells actually sense and transmit mechanical signals.

Biohacking living cells

This is where my lab steps in – we are interested in understanding the fundamental mechanisms through which cells sense physical information. We do this by building and using devices that employ tiny fingers, lasers and actuators to literally poke, stretch and feel cells while we watch how they respond. On the

other hand, we are also interested in how we might use such physical stimuli to manipulate, re-purpose and control cell biology. We are curious to know if we can use artificial physical signals to ‘biohack’ living cells. Physical inputs might include exposing cells to mechanical forces, controlling the shape of their surroundings or simply growing cells in environments in which they are not normally found. None of these approaches require genetic manipulation or pharmaceuticals; we simply change the physical environment to direct cellular behaviours. We have found that living cells are surprisingly adaptable to a stunning variety of artificial stimuli. This is interesting because we often expose cells to environments and physical stimuli that they have not evolved to cope with. This raises numerous questions about how cells are able to deal with such extremes.

New GYA member Andrew Pelling talks about biophysical manipulation at the “Research Matters”, event in Ontario, Canada.

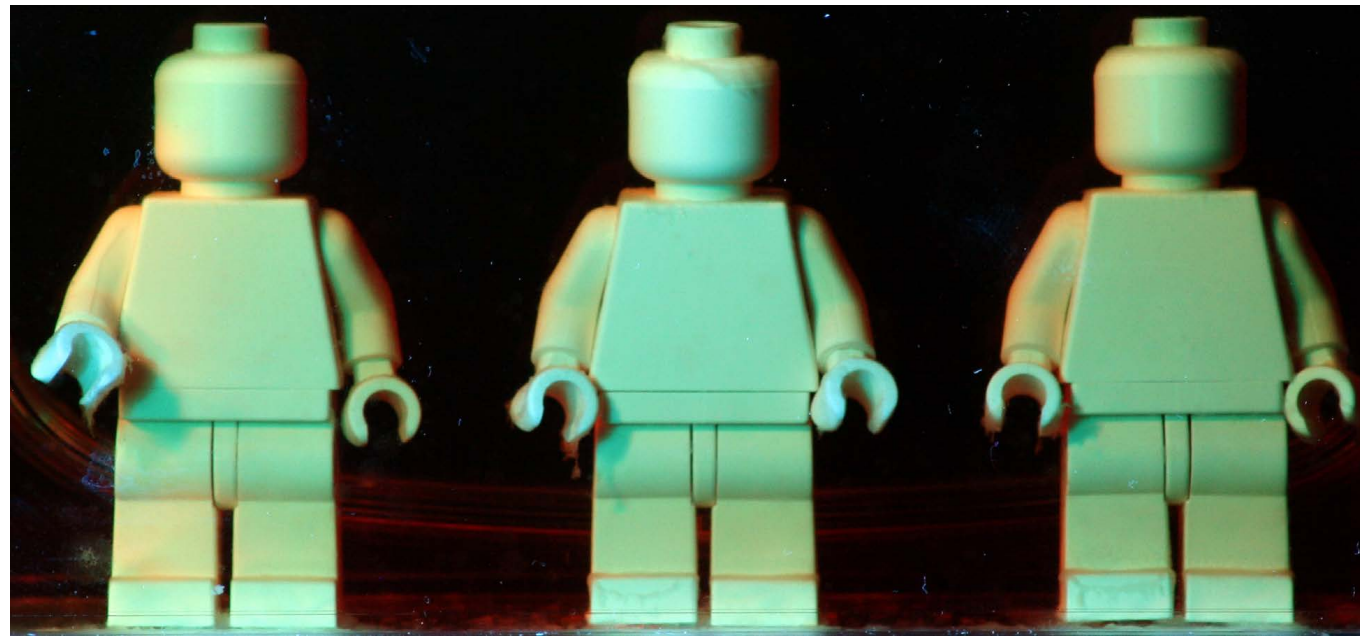


photo © 2013 Andrew Pelling, University of Ottawa

Living human cancer cells spliced with a jellyfish gene coat these eerily glowing LEGO men.

We have used physical shape to direct the three-dimensional motion and assembly of cells into defined structures, re-purposed human cancer cells as living skins on LEGO mini-figures and even successfully cultured animal cells inside of apples. When possible, we also make a concerted effort to employ open source code and hardware (Processing, Python, Arduino, Raspberry Pi, etc.) and share our knowledge as openly as we can. The lab's work has been shown at Maker Faires, artsci installations, Pecha Kucha, TEDx and many other avenues that are not traditionally the domain of an academic scientist.

Impact Beyond Academia

Our approaches often interest many people who tend to be outside the world of academic science and this has led to fruitful interactions with the Maker, DIYBio, Bioart and Biohacker communities. For example, in collaboration with Symbiotica and Subtle Technologies, we recently hosted about 20 artists in my lab for a hands-on 3-day workshop on practical tissue engineering.

It was in this context that I was

first introduced to the Global Young Academy. To be honest, I was intimidated by the fact that the GYA bills itself as the “voice of young scientists around the world”. However, after speaking

“We are interested in understanding the fundamental mechanisms through which cells sense physical information.”

with current members I began to see that my active interdisciplinary research program and engagement activities were a natural fit with the goals of the GYA. While preparing my application, I decided to ask two important bio-artists to support my membership, rather than a leading scientist. I wanted to demonstrate that my work was actually impacting a diverse community of people beyond the traditional boundaries of science (whatever those are). To my delight, I was offered membership in the GYA and I recently attended the 2013 General Assembly (GA) in Halle, Germany.

At the GA, I was extremely impressed by the quality and breadth of the GYA membership. One of the most rewarding aspects of the meeting was the

large amount of time dedicated to working groups (WG). These WGs gave members time to think deeply and critically about issues important to young scientists and actually develop policy positions,

action plans, research studies and so on. I naturally gravitated towards a new working group, “Measuring Excellence in Science Engagement”, led by Kai Chan and James Tickner. One of the goals of this WG is to determine how to assess excellence in science outreach and engagement. It is important to distinguish that measuring effective engagement is more than a numbers game. Counting hours, people or words written is unlikely to capture how effective we have been at communicating issues, impacting policies or educating, etc. As young scientists, these issues are becoming increasingly important as many of us are spending more of our time (voluntarily or otherwise) interacting with the general public, government agencies and/or industry.

Bridging the Gaps

The Dutch National ThinkTank Initiative

Eva Alisic

Participants in the Dutch National ThinkTank project at work. Consultants from McKinsey & Co. coach a diverse range of PhD students and graduates to tackle a specific societal problem.

photo © 2013 Dutch National ThinkTank



If we want science to have a positive impact on society, we need to enhance interaction and collaboration between scientists, policy makers, industry leaders and the general public. These ideas fit closely with a Dutch initiative called The National ThinkTank. Each year, the foundation gets a multidisciplinary group of 20 to 25 Ph.D. students and recent graduates together for a four month project. The brief is to develop creative, innovative and practical solutions for a specific societal problem, such as how to promote the use of green energy, how to design a sustainable food chain, or how to enhance the quality of secondary education. This year's project will continue until December 2014, and looks at the changing demands on health care.

ThinkTank members are selected

over several rounds of assessment, out of a pool of more than 200 applicants. They are picked based on analytical and communication skills, engagement in society, and creativity. The group is always highly diverse. In 2010 – when I participated – our members had backgrounds in law, engineering, philosophy, physics, history, economics, psychology and medicine, to name a few. The think tank is coached extensively, consultants from McKinsey & Company provide daily support, everyone has a ‘buddy’ (a member of an earlier group) and a professional coach.

Trust in a changing society

This support is no luxury - the project operates in a pressure cooker environment. It consists of four stages: training, analysis, solution development and implementation (see box on page 14). In 2010, the topic

was building trust in a changing society. Alongside teams looking at trust in the judicial system, trust in science, trust in social security and trust of the government in citizens, my team focussed on trust in the police. We interviewed about 40 law enforcers and stakeholders, from police academy students to chief commissioners and senior bureaucrats. In collaboration with a police union, we surveyed 1500 policemen and women. We also conducted a survey among the general public. We realised that many people form an opinion of the police through their contacts regarding petty crime cases. Because these are minor cases, many of them are never processed and hence lead to frustration among citizens. Another finding was that various police departments had actually developed great initiatives to engage citizens in a positive way



A brainstorming session during the 2010 ThinkTank project

but did not share these with their colleagues across the country. They did not optimally learn from each other.

One of the proposed solutions was to involve law students as interns for petty crime cases: it would help reduce the cases more quickly, the students would learn about policing from the inside out and the police would benefit from having bright young minds in their organisation. Another one was to collaborate with film academy students to make short films about successful new initiatives and share these through the national police library. We made an example item about having law interns solve petty crime cases to make our point. The ThinkTank project as a whole led to significant national media coverage and in-depth articles on the topic of trust.

Long term vision

The project not only rapidly leads to creative proposals for societal issues or enhances the interaction among the various stakeholders involved. Over the years, the foundation also teaches a considerable group of talented scientists, policy makers and entrepreneurs how to work together and builds a strong network of alumni. There is an explicit expectation that members are committed to staying connected. The

foundation regularly organises social and content-related meetings and supports small projects and spin-offs. The network now contains over 150 members, with those of the first editions entering senior positions in government, academia and business. The effects should start to show in the next few years.

Relevance to the GYA

The ThinkTank projects are highly intense and require a four-month full-time investment of participants. Although such long projects may not always be possible, one possibility is that the GYA could take elements of the ThinkTank formula and build on them. The GYA is currently exploring ways in which we could bring young scientists, policy makers, and entrepreneurs together for shorter sessions. It might for instance be possible to get a group together for a few days, with a follow-up after 6 months and online exchange in-between. Due to its truly global nature, the GYA is in an excellent position to collaborate with worldwide networks of young entrepreneurs and policy makers. Such a mini think tank could lead to progress on issues of social importance, increased public awareness due to the related media attention and stronger global connections among young leaders.

The four stages of the Dutch ThinkTank

1. Training (2 weeks)

- Training in collaboration, interviewing, brainstorming, analytical thinking and leadership.
- Topic-focused talks from top scientists, policy makers and business leaders.
- Social events to build connections with stakeholders and members of previous ThinkTanks.

2. Analysis (1 month)

- Literature and media study.
- Interviews and surveys among stakeholders and the general public.
- Weekly presentations for stakeholders, ThinkTank members and topic experts.

3. Solution Development (1 month)

- Creative brainstorming on directions for solutions, often in newly formed teams.
- Narrowing down initial ideas with stakeholders and topic experts
- Developing potentially strong ideas in more detail.

4. Implementation (1 month, then continued part-time)

- Development of an implementation plan, coached by experts.
- Implementation start for selected solutions, in collaboration with stakeholders.
- Development of the report and final major national presentation
- Continued implementation, writing of opinion articles, spin-offs

Eva Alisic is a research fellow at Monash Injury Research Institute. Her main area of interest is mental health after potentially traumatic events.



Jan-Christoph Heilingner

University of Zurich

photo © 2010 Thomas Dasher / Agentur Focus



In this GYA member profile, University of Zurich's **Jan-Christoph Heilingner** shares a philosopher's view of moral cosmopolitanism and the GYA.

The idea of the GYA as a global network of young researchers that collaborate and support research in diverse contexts has thrilled me since I first heard of it. When I recently became an elected member of the GYA I could not wait to meet up with the others at the annual General Assembly. True face to face meetings have special significance in a global academy, where many activities and interactions take place online. At the meeting I found myself, a moral philosopher, being part of a growing group of scholars from the humanities, social sciences and arts within the GYA which in its first years focussed more on the sciences. As a philosopher, my core topic is global ethics. So it is both for professional and personal reasons that I adore the cultural diversity in international academic networks, such as the GYA.

I studied philosophy in Germany and France, and hold a doctorate in philosophy from Humboldt-University, Berlin. I was a visiting researcher at universities in Zurich, New York and Paris. Currently, I am a postdoc at the University of Zurich in Switzerland, but I will take up a new appointment at the University of Munich in Germany soon.

Global Ethics, Global Justice

My current research on global ethics departs from the fact that the world we live in is not just. It is certainly true that many people's most basic needs such as food, shelter, security and medical care are not met. Many die from causes that could easily be prevented in principle. This should not be the case. For example, in a world in which huge amounts of food are thrown away, malnutrition should not figure as a prominent cause of

children's deaths. Neither should children die from diarrhoea, if this disease can so easily be treated. If the possibility to live a decent life depends so heavily on where someone is born – a fact completely beyond one's control – then something is seriously wrong.

Since ancient times moral and political philosophy have identified the challenge of determining justice within a society and suggested appropriate ways to realize it. But more recently, philosophy – and neighbouring disciplines like political science – have dedicated more and more attention to the topic of global justice. Important questions in this field of research are: What exactly are the basic rights of all human beings and how can they be justified? How would a just world order on a global scale look like, would there have to be a world government, or is a federation of



Children look out from Chowpatty Beach in Mumbai, India, at some of the most expensive real estate in the world. Despite rapid economic growth in many developing countries, inequality remains rife.

independent states preferable? Is it acceptable that some states or individuals are so rich – in resources, in economic power etc. – while others are not, or is some kind of compensation or redistribution due? And who exactly is responsible for ensuring that the basic needs and rights of all are met? In my current research, I am particularly interested in the last question and I address it from a “cosmopolitan” perspective qualified by the three main convictions: that each human being is

“Is it acceptable that some states or individuals are so rich – in resources, in economic power etc. – while others are not, or is some kind of compensation or redistribution due?”

of equal moral importance, that everyone has equal fundamental rights and that all humans form a morally relevant community in which moral concern is due to everybody.

Moral Cosmopolitanism

I defend a view of moral cosmopolitanism that does not only hold institutions like governments and the UN responsible for contributing to fight global injustices such as world poverty. Additionally, each individu-

al – as a “cosmo-politan”, a “citizen of the world” – has to extend his or her moral concern to all others. Of course, there are differences in the degree to which one is to be held responsible for acting. One’s involvement in the origins of world poverty for example play an important role here. Rather few people can be charged with directly causing poverty and injustice, but most of us benefit immensely from the current injustices. For example we regularly buy cheap products that were manufac-

tured under exploitative circumstances. Many connections between our seemingly unproblematic actions and their negative impact on others can be established – consumer choices being only one, our political (in-)activity being another. Such global connections and interactions support the view that there are no national solutions to challenges like world poverty (and climate change among many others).

I cannot spell out my arguments in

detail here, but I am convinced that it is an important task of academic moral and political philosophy not only to address theoretical issues like providing arguments for the universality of human rights. More straightforwardly, it is also important to engage in the challenge of raising awareness and attributing responsibility and remedial duties for the causes of deprivation and suffering in our world. And this responsibility should be individualised. After all, it is truly unacceptable and should be of universal concern for everyone that so many humans suffer from causes that could be avoided.

Within the GYA, working groups and initiatives are addressing issues that have strong overlap with these global justice and global ethics issues. Examples include the GloSYS project and the policy statement on sustainability for the UN’s Rio +20 conference in 2012. It is through such multidisciplinary networks of young researchers that the GYA can make meaningful and practical contributions to improving the life of human beings and future generations.

Building research capacity in developing countries

Impact of improved journal access in Bangladesh

Nuclear and particle physicist **Abdullah Shams Bin Tariq** shares his experience of being involved in an initiative to improve access to academic journals in Bangladeshi Universities and research institutions.



photo: © 2013 INASP-PERI Consortium/Library Consortium of Bangladesh

When I entered research in 1997 at Rajshahi University in Bangladesh, and again when I returned to the country from the UK after my doctoral studies in 2004, I found access to academic journals one of the most serious obstacles to progress. As a nuclear physicist I need to stay in touch with recent developments in my field, and I need regular access to specialized physics journals published by the American Physical Society, the Institute of Physics, Springer, Elsevier and other major publishers. Our university library, if it had any at all, held issues that were sometimes decades out of date. As a result, I was felt isolated and handicapped in my research.

As a country, our research output was extremely poor. From a country with around 150 million people, around eight thousand public university teachers and over five thousand M.Phil./Ph.D. research

students in all disciplines, we were still producing only a meagre five hundred articles a year in journals indexed by Scopus. This figure was also static, with no signs of increase over the period 1996-2002.

Research4Life and INASP-PERI

Fortunately, initiatives were launched to address this issue. First was the free (donated) access program of Research4Life which is a UN-originated programme created to provide access for developing countries to resources in the key development areas of agriculture, health, environment and innovation. Research4Life is a public-private partnership of over 200 academic publishers, and comprises four programs: HINARI for health, AGORA for agriculture, OARE for environment and ARDI for innovation. Access to these resources started in Bangladesh around 2002-2003, though in many cases, usage was low due to extremely poor awareness among

users as well as librarians. In the meantime, the International Council for Science, in view of their principle that there should be no barrier to the access of knowledge, had set up a charity named the International Network for the Availability of Scientific Publications (INASP). In 2005, Rajshahi University began talks with this organisation to be part of their Programme for the Enhancement of Research Information (PERI). The Bangladesh Academy of Sciences (BAS) had previous contact with the group and provided the central coordination point and logistics to bring together different institutions around the country. This led to the formation of the Bangladesh PERI Consortium (BIPC) under the auspices of the BAS.

This programme came with a model of negotiating for free or heavily discounted country-wide licenses for access to journals and other e-resources. Equally important

Librarians and library staff from around the country with the Bangladeshi Academy of Science leadership at a online journal training event facilitated by the author.

Closing science's gender gap

Six young women scientists from four continents share their secrets for career success



Amal Amin,
Associate
Professor,
TWAS
young
affiliate, and
Group Leader of Nano-
structured Polymers and
Nanocomposites at the
National Research
Center-Cairo, Egypt.

I have long dreamed of changing the state of the world and my country away from political turmoil towards a more peaceful state, hence I chose science as a means for achieving that. I received my Ph.D. via a joint scholarship to Germany, and continued my education through post-graduate visits in the USA, France, Germany, and other countries.

On my return to Egypt, I worked to enhance the scientific community by founding and heading scientific organisations such as the Egyptian Society and the Arab network of Advanced Materials and Nanotechnology.

As my scientific career advanced, I became coordinator of several national and international events and scientific projects, as well as supervising several postgraduate students while publishing numerous scientific papers. In 2009 I was selected as the first Egyptian young scientist to attend the summer meeting of the World Economic Forum in China. There I became a founding member of the GYA, with a deep interest in its global

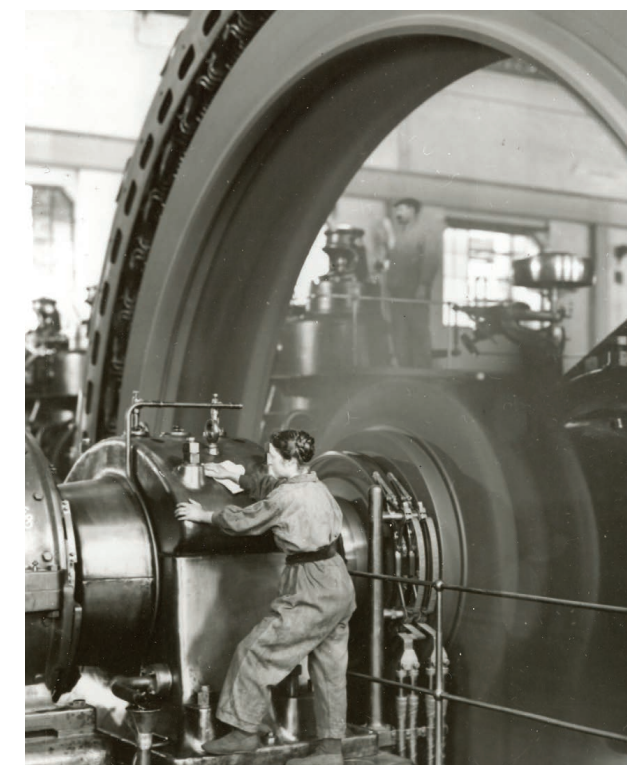


photo: © 2013 BASF used under a Creative Commons Attribution-Noncommercial license.

perspectives. I served in the Executive Committee for three years and wrote to the Egyptian Government to establish an Egyptian Young Academy.

Being an ambitious scientist in a conservative society is difficult, especially when forming family is a must. Without the encouragement of my cultured parents and husband I would not have been able to achieve this level of success, both as a scientist and as a mother of two daughters.



Ulrike
Attenberger,
MD, Associate
Professor of
Radiology,
Heidelberg
University, Germany.

A woman engineer tends to a gas turbine generator at the BASF company in 1917. Measured on the timescale of decades, the progress of women in science has been positive, but much more needs to be done to reach true gender equality.

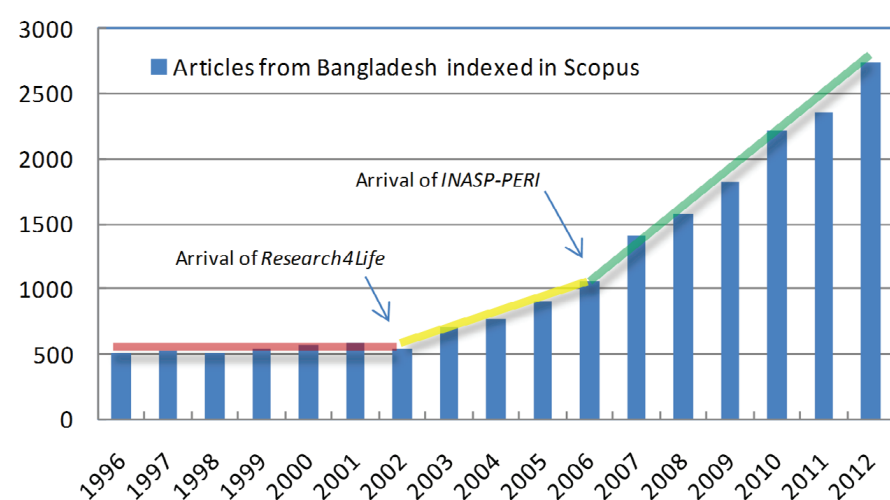
was its focus on building in-country capacity to use the resources. This proved to be vitally important, because the reality on the ground was that neither users nor library staff were ready for e-access. The consortium proved successful, and now has around 50 member institutions.

A Revolutionary Change

It has taken quite a bit of individual and collective dedication and motivated effort to get things moving. But now there has been steady growth

the research output of the country can be gauged from the figure below. It is hard to avoid the conclusion that the nearly six-fold increase in the number of publications from 2002 to 2012 can at least be partially attributed to the arrival of Research4Life and PERI.

It is clear that enhanced journal access helps in enhancing the research profile of a country. It also shows that learned academies can and should, where necessary, take up such issues. This further demonstrates how



Number of articles indexed in Scopus with the word 'Bangladesh' in affiliation

and a reasonably stable service for a few years running.

If we try to judge the coverage achieved, we can consider the teachers and M.Phil./Ph.D. students of public universities as the prime target audience. This initiative has now reached 88% of this audience, i.e. the access is now available to their institutions. Personally, now I too have access to the journals mentioned in the first paragraph of this article – some through PERI, others through Research4Life. The few that I miss of other journals is comparable to what I missed during my higher studies in UK. This is a truly revolutionary change in the level of access for researchers in Bangladesh.

The impressive effect this has had on

important the efforts are to provide access to the underprivileged or even better to lead to open access and in a wider context, a globally inclusive culture of open science. The decisions taken in science policy forums decades ago are now bearing fruit in Bangladesh and a few other countries. But there is a lot more to do to spread these successes globally and to keep them sustainable.

There have already been threats to long term stability of the programme. In the beginning of January, 2011, the publisher Elsevier withdrew access through HINARI and other Research4Life programmes, with catastrophic consequences for users. Fortunately, journals like Lancet fought for resto-

ration of access and Elsevier soon reinstated their access in Research4Life. This shows that some of these solutions may only be temporary ones. When looking into models of open access, we need to look carefully into their sustainability. The currently favoured hybrid model where the authors can pay to make their work open access, may not be sustainable if one tries to calculate the cost in making all scientific literature open access.

In my personal view one model to consider seriously is that of the Sponsoring Consortium for Open Access of Publications in Particle Physics (SCOAP³). Here a worldwide consortium collects subscriptions and pays publishers to make their journals open access. Publishers bid to stay within the collected money, knowing that if they lose out, they are left without any customer. Publishers have to learn to live with lower but reasonable subscriptions – somewhat offset by lower marketing and administrative costs. Smaller journals and publishers will probably have to merge with larger ones to survive, e.g. the current European Physical Journal is actually a merger of seven journals. However, the dynamics of publishing is different in other disciplines and one solution may not fit all.

We believe in and dream of a world where everyone will have equitable access to knowledge. Sustainable solutions need to be identified to reach our vision of a culture where science or knowledge in general will be truly global and inclusive.

Abdullah Shams Bin Tariq is an Associate Professor of physics at Rajshahi University, and a member of the GYA Executive Committee. He chairs the GYA working group on open access to research software.



I have authored 53 peer-reviewed journal articles and have earned several national and International academic awards during my career thus far. These include the 2012 “Walter-Friedrich-Award” of the German Roentgen Ray society for outstanding research in the field of Radiology and the 2010 Fellow Award of the Radiological Society of North America (RSNA)—the world’s largest Radiology organization.

In my opinion, many women have limited strategic plans for their professional career and often choose

“In my experience, if a woman plans her career strategically and advocates strongly for herself, she will find support in most cases. To do this, she must develop, from the very beginning, strategic, well-planned mid- and long-term visions of how she will build her career.”

projects of lower importance and visibility. Female scientists also seem less comfortable fighting for their own success relative to men. Thus, they become excellent team players but fail to focus on their own careers. As a result, many excellent women are overlooked for important promotions and leadership positions. In my experience, if a woman plans her career strategically and advocates strongly for herself, she will find support in most cases. To do this, she must develop, from the very beginning, strategic, well-planned mid- and long-term visions of how she will build her career. Because of this I feel it is critical to promote science among younger students (primary and secondary school, age < 18) to spur interest in academic careers: the earlier in life young people are exposed to science, the lower the barriers to choosing an academic career and

the greater the likelihood of success. Flexible options for childcare are another issue of importance for female scientists. Currently, in Germany, having a child unfortunately still slows down (or ends) the career of many high-potential female professionals.



Olanike K. Adeyemo; Associate Professor of Aquatic Epidemiology, University of Ibadan in Nigeria and Fellow

of the African Academy of Sciences (FAAS).

Being born and raised by parents who strongly believe in the empowerment of education set me off on my career path at an early age. In secondary schools in “those days” students were allotted to disciplines based on academic performance, so I was zoned into taking science subjects (Physics, Chemistry and Biology), which lead me into the Veterinary profession. I chose public health (aquatic epidemiology and toxicology) because of its vantage, dynamic role in human, livestock, wildlife and environmental health. Coupled with leadership trainings, I hold strong convictions and opinions related to integrity, equity, human rights and sustainability of planet Earth. Within the Nigerian environment, as is perhaps the case in some other African countries, for women, parenthood, spouse, home, family and community roles take priority over career and education. Females also have gender-assigned roles, which makes developing outstanding careers difficult for most women. I also realized early enough that women in science need a supportive, well-informed husband for all-round excellence. My motivation is to excel in spite of these challenges, not allowing myself excuses. My career progression is attributable to purposefully setting short- and long-term goals, staying focused, and being resilient,

with the end always in sight. I have been helped along the way by people skills, networking, collaboration, and constant, objective self-evaluation and re-evaluation to always aim high because “no one gives what he doesn’t have” (Nemo dat quod non habet). I look forward to mentoring the next generation of researchers, especially women, increasing my research frontiers and international visibility. I am confident that I shall be assuming leadership roles in my institution, country and beyond.



Laura E. Petes, Ph.D., Ecosystem Science Advisor, National Oceanic and Atmospheric Administration (NOAA) Climate

Program Office, U.S.A.

Throughout my career, I have been fortunate to have excellent role models and mentors – both male and female – who are supportive of women in science. My mother is a scientist, so as a young woman, I never doubted that it was possible to have a successful career in science. My undergraduate and graduate degrees were completed in departments that had approximately equal female-to-male faculty ratios. Many of my peers continued along the academic track, but I became interested in exploring non-academic career possibilities. Several years

“As a young scientist who is hoping to have a family in the future, I face the same daunting reality as all other US Government employees – no paid maternity leave; the only options are to take sick leave, annual leave, or unpaid leave.”

ago, after completing a postdoctoral fellowship, I transitioned from academia into a position working for

the US Government. This career change has opened my eyes to new possibilities and new challenges. While numbers are increasing, there are still relatively few women occupying leadership positions in US agencies. As a young scientist who is hoping to have a family in the future, I face the same daunting reality as all other US Government employees – no paid maternity leave; the only options are to take sick leave, annual leave, or unpaid leave. These challenges present obstacles for professional women interested in simultaneously climbing the career ladder, while also maintaining adequate work-life balance.



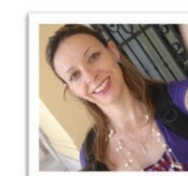
Ghada Bassioni, Associate Professor and Head of Chemistry, Ain Shams University, Cairo, Egypt.

The opportunity to work with students was my primary reason for seeking an academic career. Teaching has provided me with my most rewarding professional experiences. As a graduate of the German School in Cairo, I always dreamt of combining the well-structured and organized German education system with a career path in Egypt. Moving with my four-month-old daughter and my supportive husband to Germany was important for my career but was a challenging step for my husband and I. Finding a trustworthy babysitter in a country where we had no family and friends was an example of the type of obstacle that an internationally mobile young woman scientist can face.

After my Ph.D. I started to engage with women’s issues. I was elected as the women’s representative of the Chemistry Department at the Technische Universität München and was the Chair of the women’s

initiative at the American Institute of Chemical Engineering, Abu Dhabi, a few years later. I completed several projects as a result of these efforts and became the coordinator of two international collaborations.

However, as a full-time working mother and lover of science and research, I was afraid that I would fail at multi-tasking by taking this career path. Soon I learned that (like with my own mother working in a leading position) my path has only helped my daughter grow and become independent. Fifteen years later she is a successful, career-driven student herself. This year, I was blessed with another daughter, and I know now that raising her would not be any different. As Egyptian Nobel Laureate Naguib Mahfouz put it: “The woman is the greatest among God’s creation; for her different roles in the history of Egypt; for her struggle, faithfulness and chasteness.” This describes the way I see myself, reflecting what I am and what I can achieve.



Tatiana Duque Martins, Professor and Chemistry Courses Coordinator at Federal

University of Goias – Brazil.

I received my Degree in Chemistry in 1999, Masters in 2001 and my PhD in 2006. My scientific interests are on the photophysical and morphological characterization of conjugated polymer and nanostructured peptides, aiming at application in photovoltaic cells, biosensors and electroluminescent devices.

To be a female scientist in Brazil is a choice that must be made at early age, and women need to fight for it even when there are no expectations of success. Many women, in

order to achieve a solid career, have to give up on the possibility of being a mother and having a family, a challenge that is not experienced by men. Sometimes they need to give up on their femininity in order to express commitment to work. Like many others, I have been committed to scientific work since college, never giving up, even when money was short. As a way to en-

“I have been committed to scientific work since college, never giving up, even when money was short. As a way to ensure the financial support I needed to keep studying, I took advantage of my ability in martial arts and taught karate.”

sure the financial support I needed to keep studying, I took advantage of my ability in martial arts and taught karate. I acted as General Secretary of the Brazilian Confederation of kung fu, where I learned how to be heard in a masculine world and how to deal with several tasks at once. Now I am involved in science by co-leading a network of professors of several Brazilian universities, which is bringing advances to the university where I work, supporting the studies of graduate students and helping to develop new research areas in Brazil’s Middle West. Also, I have a key role in my university’s administration by acting as Undergraduate Coordinator and as President of the Chemistry Professors Council. Finally, I am the proud mother of a young future scientist, which I consider my major accomplishment and which completes my career!

[1] Nature **495**, 5 (07 March 2013)

The 2013/14 GYA calendar

October-December Participation in regional meetings of the Global Research Council

10-14 November NASAC Conference and GA in Addis Ababa/Ethiopia

15 November Alexander von Humboldt Foundation Internationalization Forum: "Postdoctoral Career Paths 2.0"

18 January Sophie Charlotte Salon at the BBAW, Berlin.

21 January Launch of the GloSYS Report in Berlin

3-5 February 2014 Africa Regional Young Academies meeting, Nairobi, Kenya

13-14 February 2014 Asia Regional Meeting in Japan

21-25 May GYA General Assembly 2014 in Santiago, Chile. Tentative theme of "Natural Resources in a Finite World".



The Andes create a stunning backdrop to buildings in Santiago, Chile. Santiago has been chosen as the venue for the next GYA General Assembly, to be held in May 2014.

Recent News

New GYA Executive Committee Elected The last day of the General Assembly meeting in Halle was devoted to internal affairs and election of new leadership, including Sameh Soror from Egypt and re-elected Rees Kassen from Canada as Co-Chairs. Also elected at the meeting were Executive Committee members Abdullah Shams Tariq (Bangladesh), Bettina Speckmann (Netherlands), James Tickner (Australia), Jose Correa (Chile), Laura Petes (USA), Michael Sutherland (UK), Olanike Adeyemo (Nigeria), Phil Gona (Zimbabwe/USA), and Vidushi Neergheen (Mauritius).

The next General Assembly of the GYA will be held in Santiago, Chile, May 21-25, 2014 with a tentative title of "Natural Resources in a Finite World". With a population of 17 million people, Chile has a relatively large educated middle class and a small and robust free-market economy. Santiago is a 6.5 million people metropolis, increasingly multicultural, and considered to be one of the safest and most liveable cities in Latin America. Chile leads scientific research in Latin America, publishing more papers per capita in international journals than most countries in the region, and ranking 1st in South America in terms of citations per article. Having a focus on natural resources, from human development to sustainability in a global perspective, the organization of the GA 2014 in Chile will represent an excellent opportunity to open the way for researchers in the region, helping them to establish new collaboration networks with leading young colleagues, increasing the influence of the GYA in Latin America and the world.

National Young Academies Several GYA members have been elected onto the Executive Committees of their respective National Young Academies, including Karen Lorimer (Scotland), Daniel Chappell (Germany), Vinitha Thadhani (Sri Lanka - President) and Abidemi Akindele (Nigeria - President). Others were called into steering committees for the formation of new National Young Academies in Canada, Ghana, Kenya, Senegal, Spain.

World Economic Forum Meeting This year the GYA was involved in the nomination process for young scientists attending the World Economic Forum's annual meeting of the new champions in Dalian, China. 10 GYA members and 8 members of National Academies were selected to attend the event, held from 11-13 September 2013.

