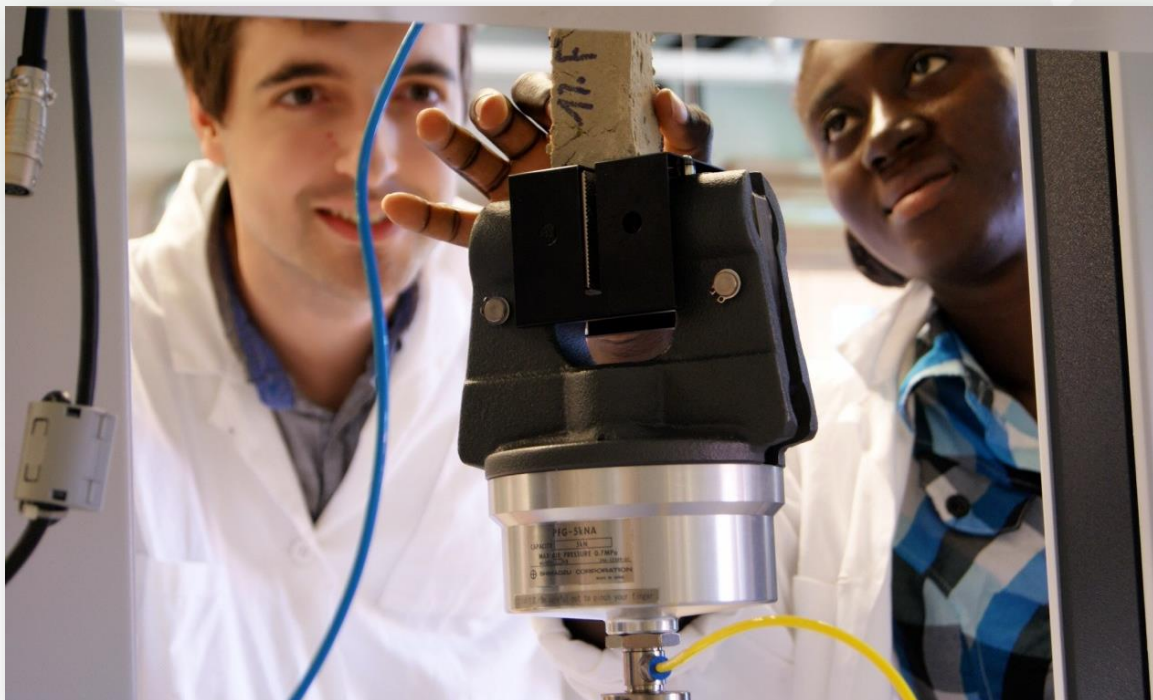




UPPSALA  
UNIVERSITET

INTERNATIONAL  
SCIENCE  
PROGRAMME  
ISP

# Tracing ISP Graduates 2008-2013





UPPSALA  
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# INTERNATIONAL SCIENCE PROGRAMME ISP

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April 2016, Uppsala  
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# Abbreviations & Acronyms

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AiBST	African Institute of Biomedical Science and Technology
AFSIN	African Spectral Imaging Network
ANCAP	African Network for the Chemical Analysis of Pesticides
ANRAP	Asian Network of Research on Antidiabetic Plants
BAN	Bangladesh
BUF	Burkina Faso
BURK	Burkina Faso
CAM	Cameroon
EAUMP	Eastern African Universities Mathematics Program
ETH	Ethiopia
GHA	Ghana
IMS	National Institute for Mathematical Sciences
IPICS	International Programme in the Chemical Sciences
IPMS	International Programme in the Mathematical Sciences
IPPS	International Programme in the Physical Sciences
ISP	International Science Programme
KEN	Kenya
LANBIO	Latin American Network for Research in Bioactive Natural Compounds
MAL	Mali
MAW	Malawi
MSSEESA	Materials Science and Solar Energy Network for Eastern and Southern Africa
NABSA	Network for Analytical and Bioassay Services in Africa
NADMICA	Nature Induced Disaster Mitigation in Central America
NIG	Nigeria
PER	Peru
RABiotech	West African Biotechnology Network
SEANAC	Southern and Eastern Africa Network for Analytical Chemists
SRI	Sri Lanka
TAN	Tanzania
ZAM	Zambia
ZIM	Zimbabwe

# Executive summary

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## THE ISP MODEL

The International Science Programme (ISP)<sup>1</sup> at Uppsala University, Sweden, assists developing countries to build and strengthen their research capacity and postgraduate education in chemistry, mathematics and physics, by long term support to institutionally based research groups and regional scientific networks.

The ISP model is designed to prevent brain drain by improving local conditions for research and postgraduate training. When local training is not possible, sandwich postgraduate training is employed, where students spend part of their training at their home university and part at a more resourceful scientific host institution abroad.

The focus of this report is PhD graduates from ISP supported research groups and networks during the period 2008-2013, to trace where they are today and what they are doing.

## TRACING GRADUATES

In total, 161 PhD students have graduated from 28 research groups and 11 networks supported by ISP 2008-2013. Out of the 161 graduated PhD students 154 were traced, 28 of them female (18%).

## PRESENT AFFILIATION

Most of the traced PhD graduates (142; 92%) are currently working in their home countries or regions, 18% of these graduates are female. A majority of the graduates are employed at universities or research institutes, mainly as Lecturers or Senior Lecturers. A few are employed outside the university sector but within their home country or region, working at government agencies or international organizations.

Twelve graduates (8%, three of them female) are currently working or living in OECD countries, all but two are employed at universities or research institutes.

When comparing the three disciplines, 91% of the chemistry, 92% of the mathematics, and 95% of the physics graduates have remained in their home countries or regions after graduation. In addition, a high share of both sandwich (87%) and local students (96%) have stayed in their home countries or relocated within the regions.

## RESEARCH ACTIVITY

Based on an internet search until 2015, 60% (97/161) of the graduates between 2008 and 2013 have published papers in Web of Sciences listed journals after graduation.

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<sup>1</sup> ISP is financed by the Swedish International Development Cooperation Agency (Sida), Uppsala University and, since 2011, Stockholm University.

# Tracing ISP graduates 2008-2013

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## THE ISP MODEL

The International Science Programme (ISP) at Uppsala University, Sweden, aims to contribute to the growth of scientific knowledge in Africa, Asia and Latin America. ISP assists developing countries in these regions to build and strengthen domestic research capacity and postgraduate education in chemistry, mathematics and physics, by providing long term support to institutionally based research groups and regional scientific networks.

The ISP model is designed to prevent brain drain by improving local facilities and conditions for research and by promoting local postgraduate training. When local training is not possible, sandwich postgraduate training is employed, where students spend part of their training at their home university and part at a more resourceful scientific host institution abroad, in the North or in the region.

ISP's activities are financed by the Swedish International Development Cooperation Agency (Sida), Uppsala University and, since 2011, Stockholm University.

The focus of this report is PhD graduates from ISP supported research groups and networks during the granting period 2008-2013, to trace where they are today and what they are doing.

## TRACING GRADUATES

In total, 161 PhD students have graduated from 28 research groups and 11 networks supported by ISP 2008-2013.



*Ms Fati Zoma, PhD student of an ISP supported research group at University of Ouagadougou, Burkina Faso.*

In all, 68 PhD students graduated in chemistry, 51 students in mathematics, and 42 students in physics. On average, the PhD graduates completed their studies in 4.8 years.<sup>2</sup> Out of the 161 graduated students, 70 (44%) were sandwich students, while 90 graduates have spent their research training either to a full extent in their home countries or to a full extent at a host university in their region. One graduate did the PhD training full time at a host university in Sweden.

In total, 154<sup>3</sup> (96%) of the 161 PhD students that have graduated between 2008 and 2013 were traced via direct email contact, through group leaders and network coordinators, or by internet search.

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<sup>2</sup> The completion time is calculated as graduation year minus starting year, plus 0.5 years to compensate for potential bias due to at what time of the year the graduate started and graduated.

<sup>3</sup> This includes all 70 sandwich graduates.

## PRESENT LOCATION

Most of the 154 traced PhD graduates (92%) are currently working in their home countries (126) or regions (16), 25 of these graduates being female. Twelve graduates (three female) are currently employed outside their country and region of origin, working or living in OECD countries (Table 1).

Considering the three programs, 91% of the chemistry graduates, 92% of the mathematical graduates and 95% of the physics graduates have remained in their home countries or regions after graduation. The Mathematics and Chemistry Program has a higher share of regional mobility (16 and 12%, respectively) than the Physics Program (0%), and also a higher mobility to OECD countries (Table 2).

A slightly higher share of students trained locally (96%) have stayed in their home countries or relocated within the regions, compared to sandwich students (87%) (Table 1).

## PRESENT AFFILIATION

A majority of the 154 traced graduates (119; 77%) is currently working at universities or research institutes in their home countries (Figure 1). Many of the graduates hold positions as Lecturers or Senior Lecturers.

Seven (5%) of the 154 graduates are currently working outside the university sector, but within their home countries. These graduates are employed at the Food and Agriculture Organization of the United Nations (FAO), the National Tuberculosis Program, and the National Hospital, all in Burkina Faso; at the Ghana Atomic Energy Commission; at the National Council for Higher Education in Uganda; at the Bangladesh Bank Taka

Museum; and at the Ashania Mission Cancer and General Hospital in Bangladesh.

While 126 graduates still are in their home countries, 16 (10%) have relocated within Africa (Figure 1), now employed in Burkina Faso, Cameroon, Gabon, Kenya, Mali, Mauritania, Nigeria, Senegal, South Africa, and Zambia. Half of the relocated graduates were sandwich students and half were local students. The remaining 12 (8%) are currently working in OECD countries, in Canada, France, Saudi Arabia, Sweden, and the US. Nine of these graduates were sandwich students. Almost all are employed at universities or research institutes.

## GENDER DISTRIBUTION

Out of the 154 graduates traced, 28 are female (18%), most of them in the Chemistry Program. Ten out of the 28 females were sandwich students (Table 1). The majority of the female graduates (22, seven of them sandwich) are working at universities and research institutes in their home countries or regions, three (one sandwich) are employed outside the university sector in the home country of graduation and three (two sandwich) are currently in OECD countries, two at research institutes or universities, and one unemployed.

## RESEARCH ACTIVITY

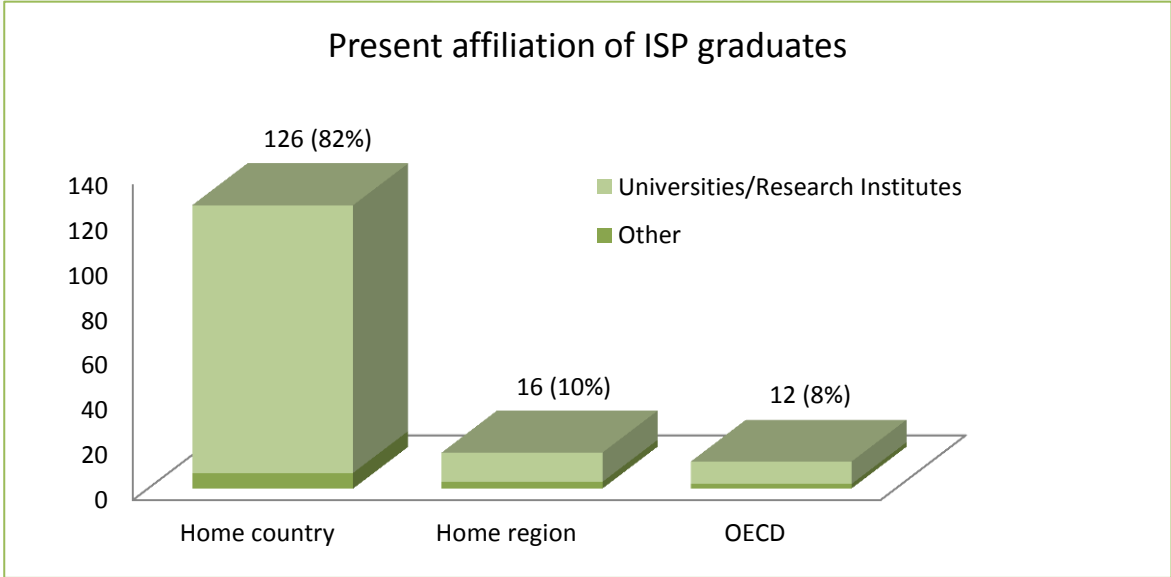
Based on an internet search until 2015, 97 of the 161 (60%) graduates between 2008 and 2013 have published papers in Web of Science listed journals after graduation.

**Table 1.** Present location of traced graduates by type of training and gender (F= female; numbers indicate how many of the total in each category)

Program	Home country	Region	OECD	Total
Sandwich graduates	53 (6F) 76%	8 (2F) 11%	9 (2F) 13%	70 (10F) 100%
Local graduates	73 (14F) 87%	8 (3F) 9%	3 (1F) 4%	84 (18F) 100%
<b>Total</b>	<b>126 (20F) 82%</b>	<b>16 (5F) 10%</b>	<b>12 (3F) 8%</b>	<b>154 (28F) 100%</b>

**Table 2.** Present location of traced graduates by program (F= female; numbers indicate how many of the total in each category)

Program	Home country	Region	OECD	Total
IPICS	51 (12F) 79%	8 (4F) 12%	6 (3F) 9%	65 (19F) 100%
IPMS	37 (5F) 76%	8 (1F) 16%	4 (0F) 8%	49 (6F) 100%
IPPS	38 (3F) 95%	0 (0F) 0%	2 (0F) 5%	40 (3F) 100%
<b>Total</b>	<b>126 (20F) 82%</b>	<b>16 (5F) 10%</b>	<b>12 (3F) 8%</b>	<b>154 (28F) 100%</b>

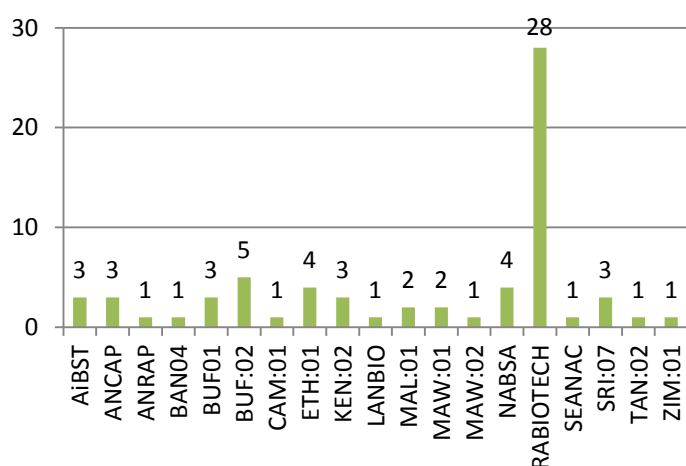


**Figure 1.** Present location and affiliation of traced ISP PhD graduates (number and %).



## The Chemistry Program – IPICS

In the Chemistry Program, 13 groups and six networks supported by IPICS graduated 68 PhD students between 2008 and 2013 (Figure 2). The network RABiotech stand out with 28 PhD graduations over the years. In all, IPICS supported networks stand for 57% of the PhD graduations and supported research groups for 43%. The average completion time of PhD graduates from groups and networks within the Chemistry Program was 4.8 years.<sup>4</sup>



**Figure 2.** Number of IPICS graduates by research group and network.

### PRESENT AFFILIATION

The present affiliation was found of 65 (19 of them female) of the 68 chemistry graduates. Most of the traced graduates (74%, 48) are employed at universities or research institutes

in their home countries (Figure 3). Eleven of these are female.

Many of the traced graduates (21) hold positions as Lecturers at universities in their home countries. Some have the position of Senior Lecturer (4), Assistant (5), and Associate Professor (1), and one is Deputy Vice Chancellor. Three graduates are Group Leaders or Deputy Group Leaders of ISP supported research groups. Graduates are also employed as Research Manager (2), Director of Research (1), and Research Officer (3). In addition, there is one laboratory assistant and there are six graduates with unknown positions.

In addition to the 48 graduates working at universities and research institutes, three graduates (5%, one female) remaining in their home countries are employed outside the university sector. Two are from the RABiotech network. One is working as a Nutrition Coordinator at the Food and Agriculture Organization of the United Nations (FAO) in Burkina Faso, and the other is coordinating the National Tuberculosis Program in the country (Programme National Tuberculosis, PNT). One graduate from BUF:01 in Burkina Faso is currently working at the National Hospital at Ouagadougou.

The remaining graduates (14, seven of them female) are today working and living outside their home countries. Eight out of these graduates (12%) have relocated within Africa, while the remaining six (9%) currently are employed in OECD countries (Figure 3).

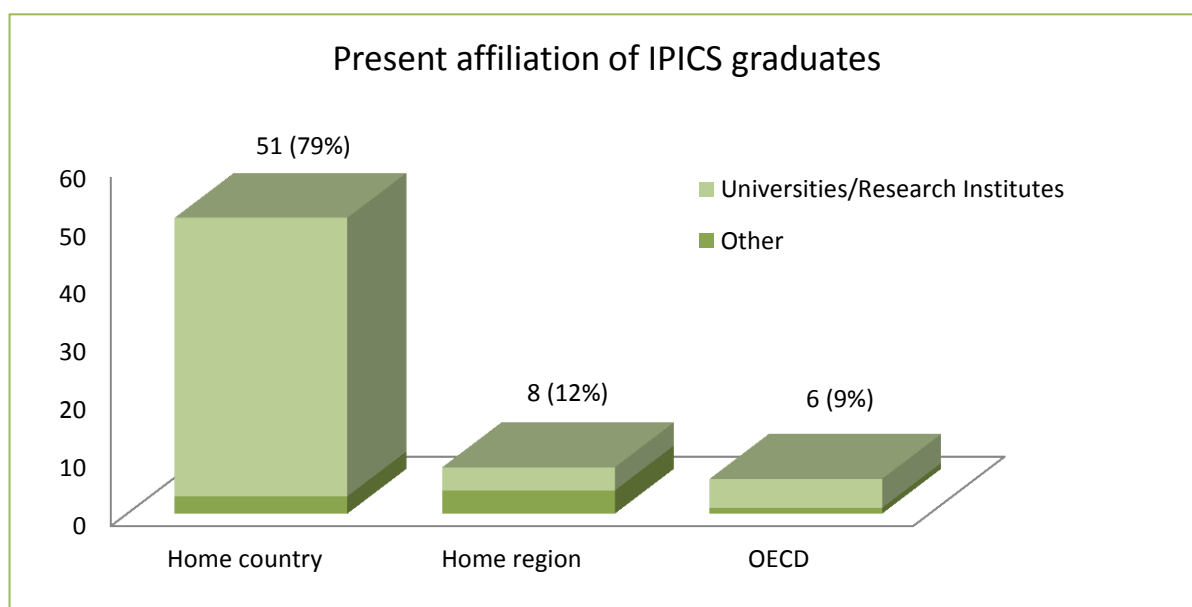
<sup>4</sup> The completion time is calculated as graduation year minus starting year, plus 0.5 years to compensate for potential bias in what time of the year the graduate started and graduated. Data for 66 of the 68 graduates is included in the calculation, out of which 15 were listed as sandwich students.

A graduate from the AiBST research group in Zimbabwe is currently Associate Professor at the Department of Pharmaceutical & Medicinal Chemistry at the Niger Delta University, Nigeria. A graduate from the ANCAP network, originally from Tanzania, is currently working part time as an administrator at Stockholm University. Two graduates from the Ethiopian group ETH:01 are currently post-doctoral fellows at Howard University, US, and University of South Australia, respectively. A graduate from NABSA in Botswana is currently living in Canada and is unemployed. Five graduates from the network RABiotech are currently working outside their home country Burkina Faso. One is an Emergency Nutrition Specialist at Plan International Cameroon, one is working at the Institute for Disease Modeling in the USA, one is a Lecturer at University of Ottawa, Canada, one is working at the Institut d'Economie Rurale (IER) in Mali, and the fifth

is working at university Omar Bongo in Gabon. A South African graduate, from SEANAC, is currently a Lecturer at Karatina University, Kenya, and a graduate from the Zimbabwe group ZIM:01 is currently working at the Council for Scientific and Industrial Research (CSIR), in South Africa. A graduate from a research group in Kenya (KEN:02) is currently working at the Muhimbili University of Health and Allied sciences in Tanzania, and a graduate from the Malawian research group MAW:01 is currently working at a potato research center in Zambia.

### GENDER DISTRIBUTION

Of the 65 traced graduates 19 are female (29%). Eleven of them are working at universities and research institutes, and one is working outside the university sector, in their home countries. Seven are working outside their home countries, four relocated within in Africa and three to OECD countries.



**Figure 3.** Present location and affiliation of traced IPICS PhD graduates (number and %).

## IPICS Graduate – Dr Desta Antenehe Gedefaw

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Dr Desta Antenehe Gedefaw graduated in 2011 at Addis Ababa University, Ethiopia, with a chemistry group working on the synthesis and characterization of conjugated polymers.

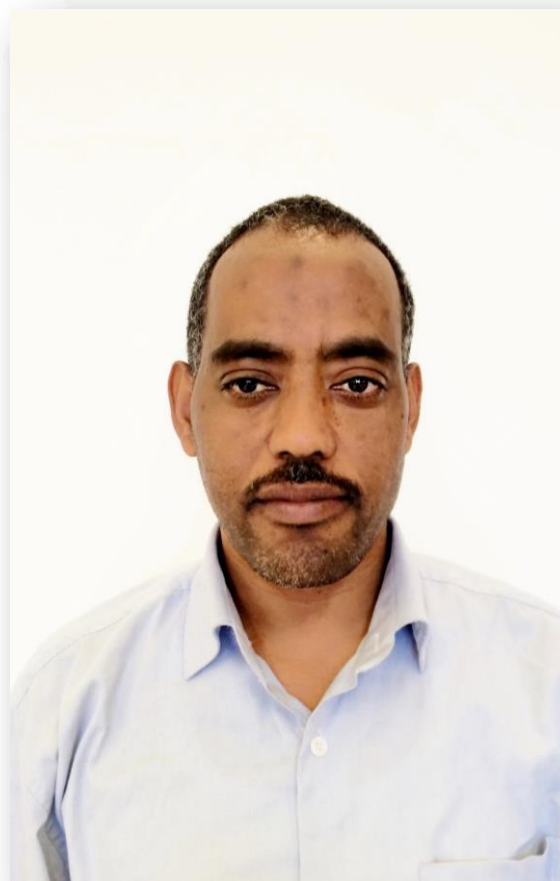
Desta's research focus is development of materials for solar cell applications, particularly the development of "green solvent" processable materials. Alternative energy sources is an increasingly important area of study in countries like Ethiopia, where the future energy demand is expected to rise as a result of population growth and improved living standards.

- *Some of the materials that have been designed and synthesized in my group are found to be very promising in terms of the power conversion efficiency achieved, as well as other desired parameters of the materials, such as stability, for future large-scale production of solar cell devices.*

During his PhD studies, Desta was a sandwich student, spending part of his research training at Chalmers University of Technology, Gothenburg, Sweden, and part at Addis Ababa University, Ethiopia. Desta believes that the sandwich model gives students the opportunity to work in the most advanced research facilities and to gain research experiences in a setting different from what they are used to at their home university. In addition, important contacts for future research collaboration are established.

Currently, Desta is working as a Research Associate at the Future Industries Institute,

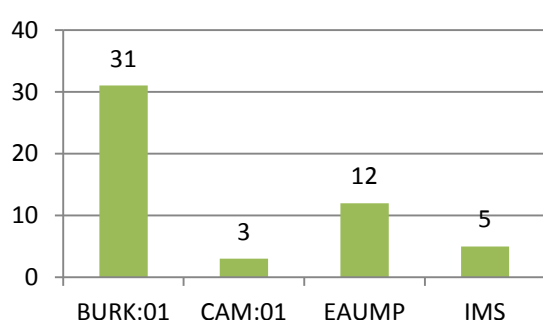
University of South Australia. He took the position to further build up his research capacity in the field of conjugated polymers, small molecules, and oligomers for solar cell applications. In the future, Desta plans to establish his own research group in one of the many colleges/universities in Ethiopia, something that will enable him to contribute to the human resource development in his country.



# The Mathematics Program – IPMS

One mathematics group and three networks supported by IPMS have graduated 51 PhD students between 2008 and 2013. Most of the graduates have been trained in networks (90%), BURK:01 being a major contributor with a total of 31 graduates (Figure 4).

The average completion time of all graduates from mathematical research groups and networks was 4.5 years.<sup>5</sup>



**Figure 4.** Number of IPMS graduates by research groups and networks.

## PRESENT AFFILIATION

The present affiliation was found of 49 of the 51 graduates from the Mathematical Program. Six of the traced graduates are female.

Most traced graduates (72%, 31 males and four females) are employed at universities or research institutes in their home countries (Figure 5). However, positions are known only for 19 graduates. Most of these are employed as Lecturer (7) or Senior Lecturer (9). Among

graduates are also one Researcher, one Postdoc, and one is the Director of the Academic Programs for the Africa Institute in Ghana.

In addition to these 35 graduates, two (4%, one of them female) are still in their home countries but employed outside the university sector. One graduate from the research group IMS in Ghana, is working as a Manager of the National Data Centre at the Ghana Atomic Energy Commission, and one Ugandan graduate from the EAUMP network is a Senior Higher Education Officer at the National Council for Higher Education in Uganda.

The remaining graduates (eleven males, one female) are currently working outside their country of origin. Eight (16%) have relocated within Africa while four (8%) are currently working in Europe, North Africa and Asia. All graduates are employed at universities or research institutes (Figure 5).

All but one of these twelve graduates are from the network BURK:01. Three graduates from the network are now working at universities in Senegal, two at Alioune DIOP de Bambey University, and one at Assane SECK de Ziguinchor University. In addition, one Burkina Faso graduate is working at University of Nouakchott in Mauritania. A Mali graduate from the network is working at the Polytechnic University of Bobo Dioulasso, Burkina Faso. One Senegal graduate from the network is working at the International Institute for Water and Environmental Engineering (2IE), Ouagadougou, Burkina Faso, and another at University of Ouagadougou.

<sup>5</sup> The completion time is calculated as graduation year minus starting year, plus 0.5 years to compensate for potential bias in what time of the year the graduate started and graduated. Data for 49 of the 51 graduates is included in the calculation out of which 39 were listed as sandwich students.

One graduate from the Cameroon network CAM:01 is now Researcher at the school of Computer Sciences and Applied Mathematics, University of Witwatersrand, in South Africa.

Four graduates from BURK:01 are currently working outside Africa; in France (University Claude Bernard Lyon), in Canada (University of Laval), in Saudi Arabia (King Abdullah University of Science & Technology), and in Sweden (Uppsala University).

### GENDER DISTRIBUTION

Six (12%) of the 49 graduates are female. Four are working at universities and research institutes in the home country, one is working outside the university sector in her home country, and one outside the home country, but within the region.

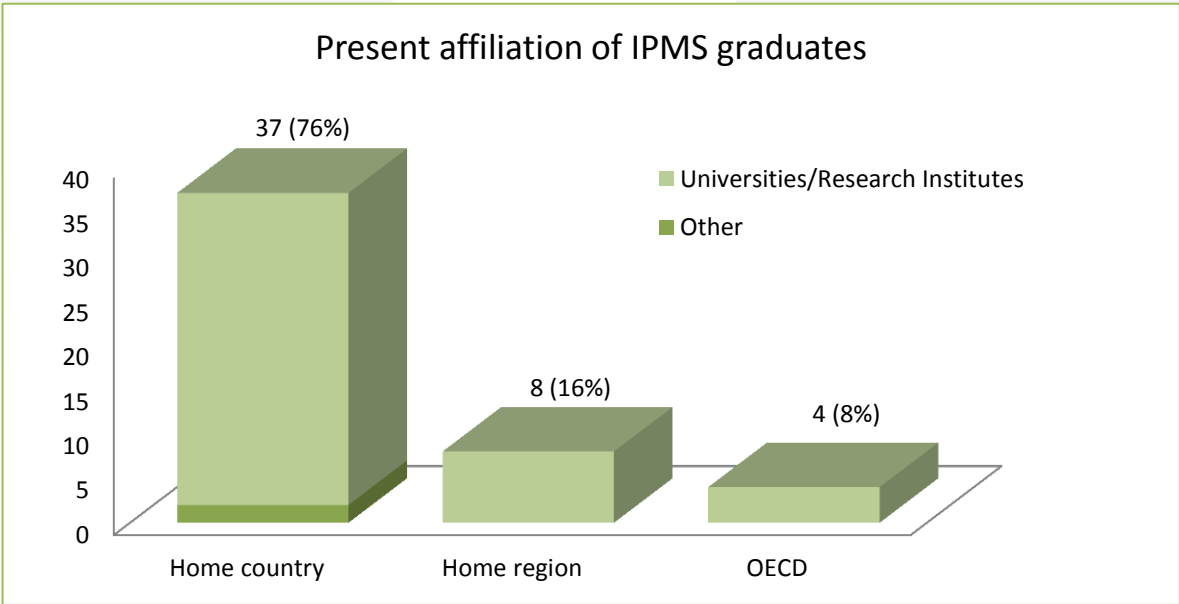


Figure 5. Present location and affiliation of traced IPMS PhD graduates (number and %).

## IPMS Graduate – Dr Betty Kivumbi Nannyonga

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Dr Betty Kivumbi Nannyonga graduated in 2012, from Makerere University, Uganda, through the ISP supported mathematical network East African Universities Mathematics Program (EAUMP). She was a sandwich student spending part of her PhD training at Makerere University in Uganda and part at Uppsala University, Sweden. She was the only female PhD student to graduate from the network between 2008 and 2013.

Betty's research field is biomathematics - the use of mathematical models to explain aspects of biology. More specifically she is focusing on the modeling of infectious diseases and development. During her PhD studies she did research on malaria, HIV, hepatitis E, and sleeping sickness.

The data needed was provided by the Ugandan Ministry of Health and helped her and other professionals working in the health sector to predict outcomes of specific actions targeting the diseases.

- *When I started my PhD I wanted to do something that could be applied in Uganda. We have a lot of infectious diseases in the country and it is a big problem. With the results from the modeling you can advise the Ministry of Health and health care professionals on what results to expect in the future of a specific action. The models can advise on the best investment to fight a disease in terms of how much should be spent on treatment, follow-up, and information and so on.*



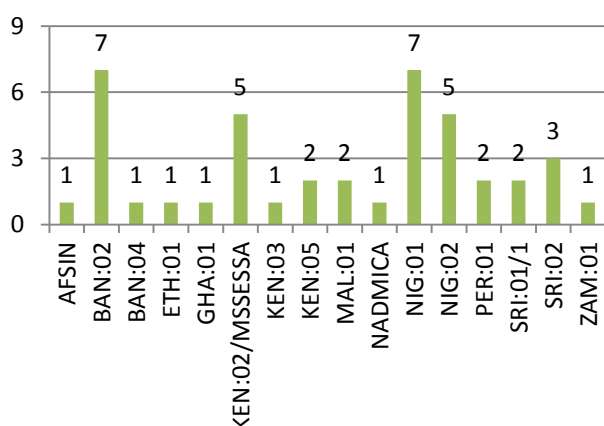
After graduation Betty did a two-year postdoc at the Department of Mathematics at Uppsala University. Currently, Betty is one of three women working as lecturers at the Department of Mathematics at Makerere University, where she continues her research on biomathematics.

Continuously, she is also working with the issue of underrepresentation of women in the basic sciences at all levels at her university.

# The Physics Program – IPPS

In the Physics Program, 42 PhD students of 13 research groups and three networks graduated between 2008 and 2013 (Figure 6). A large majority of the graduates comes from research groups (83%).

The average completion time of PhD graduates from groups and networks within the Physics Program is 5.6 years.<sup>6</sup>



**Figure 6.** Number of IPPS graduates by research group and network.

## PRESENT AFFILIATION

The present affiliation was found of 40 (three of them female) of the 42 graduates from the Physics Program. All but four of these graduates (90%, 34 males and two females) are employed at universities in their home countries (Figure 7).

Currently, most hold a position as Lecturer (6) or Senior Lecturer (11), and seven are Associate Professors. Among graduates is also one Leader of an ISP supported group, and one is Vice Principal of the Fazilatunnesa Mujib Government College, Bangladesh. The present position of ten graduates working at universities and institutes are unknown.

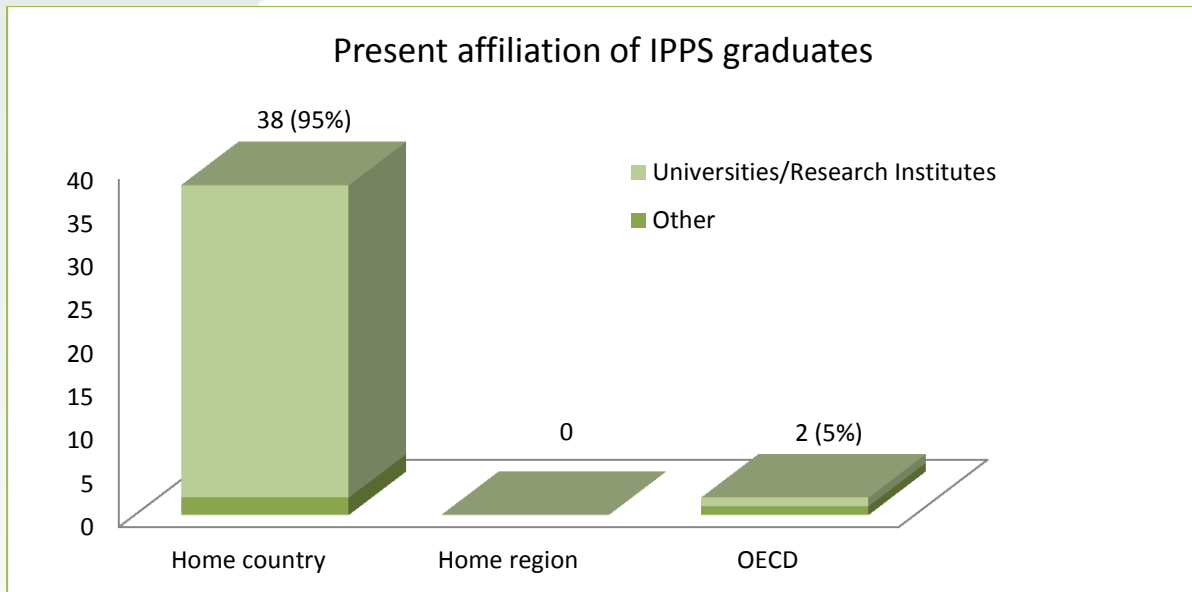
Two graduates (5%), one female and one male, are employed outside the university sector. One is a keeper at the Bangladesh Bank Taka Museum, and the other a Medical Physicist at the Ashania Mission Cancer and General Hospital, also in Bangladesh.

Two male graduates (5%) are employed outside the country and region of graduation, both in Canada. One graduate from the network NADMICA is currently a Postdoc at University of Saskatchewan, Canada. A graduate from the Sri Lankan physics group SRI:01/1 is working for a carrier company in Canada.

## GENDER DISTRIBUTION

Three (8%) of the 40 graduates are female. Two of these are working at universities and research institutes, and one outside the university sector, all in their home countries.

<sup>6</sup> The completion time is calculated as graduation year minus starting year, plus 0.5 years to compensate for potential bias in what time of the year the graduate started and graduated. Data for 38 of the 42 graduates is included in the calculation out of which 12 were listed as sandwich students.



**Figure 7.** Present location and affiliation of IPPS PhD graduates (number and %).



## IPPS Graduate – Dr Wasana Jayawardena

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Dr Wasana Jayawardena received her PhD in 2012 from University of Colombo in Sri Lanka, through the ISP supported research group in Atmospheric Physics and Lightning. She is the only researcher in the atmospheric modeling field in Sri Lanka.

In her doctoral research, she has been working with the Meteorological Institute of Uppsala University (MIUU) model for atmospheric modeling, to simulate weather and climate. The model can be used to simulate the atmosphere for prediction of natural disasters and estimating the air pollution levels. It is not yet used for operational forecasts in Sri Lanka, but there are some interesting outcomes of the simulations.

- *The model has been used to identify what influence the central mountain area in Sri Lanka has on local weather. Through significant control of the topography, especially of the central mountain areas, the meso-scale weather could clearly be explained through the model simulations. The model has also been used to see how air pollution spreads with the wind and how high the pollution levels are in certain areas.*

Wasana was the first female student to obtain a post-graduate degree from her research group at Colombo University. She had the opportunity to continue to work and do research with the support of her husband, but points to that it is not always the case for women in Sri Lanka.



- *Sri Lankan culture is preventing women to attend higher education. As a woman you cannot for example go to field-work without permission from you parents or your husband, and most women give up their carriers after they get married.*

Wasana recently returned to Sri Lanka after finishing a six-month postdoctoral position at the Geo Centre, Uppsala University, Sweden. Back in Sri Lanka, Wasana continues to do research and teach at the Open University in Colombo, where she is now employed.