

Report of Women in Physics in South Africa 2007

Overview

As a means of addressing the under-representation of Women in Physics internationally, the Department of Science and Technology (DST) funded the South African Institute of Physics (SAIP) to start the Women in Physics in South Africa (WiPiSA) Project. The Women in Physics Project was launched in November 2005 in Durban and it became known as WiPiSA. The launch conference of WiPiSA was a great success. International speakers and attendees of the World Conference on Physics of Sustainable Development (WCPSD) and the US-Africa Advance Studies Institute on Photon Interaction were able to attend. The WiPiSA launch conference was sandwiched in between the two international events, which made it easy for the participants of both conferences to attend the launch conference of WiPiSA without incurring additional costs. A working group was selected at the launch to lead WiPiSA. Members of the working group met regularly throughout 2006 to deliberate and make progress on issues that affect women in physics.

Aims

The following aims have been developed for WiPiSA, which embrace the international aims of Women in Physics, but are also unique to the South African situation, as identified in the pre-launch workshop:

- To stimulate an interest in physics amongst girls and women
- To encourage girls and women to study physics
- To encourage and support girls and women to work in physics-related careers
- To assist in removing or overcoming obstacles and barriers for girls and women to study physics and work in physics-related careers

Objectives

In the same pre-launch workshop, the following objectives were identified:

- To attract girls into physics
- To support women embarking on careers in physics
- To promote women in physics in leadership roles
- To break stereotypes that discourage women from studying physics and working in physics-related careers
- To support women in physics who need to balance family and career
- To promote the creation of flexible jobs (not only full-time) that will allow women in physics who have families to follow meaningful career paths
- To promote funding criteria that take into consideration women who have families (and may interrupt their career for a time)
- To improve institutional structures and climate for women in physics
- To challenge gender discrimination in selection procedures and the workplace

In achieving the aims the following activities were undertaken:

1. Working Group Meetings

The Working Group had meetings on the following dates:

2006

8 February
20 April
9 June
28 July
October
1 November

2007

23 February
12 April
1 June

The meetings of the working group were characterised by harmony and growth in the personal lives, and that on its own is an achievement in addressing the issues that affect women in physics in South Africa. Some of the WiPiSA working group have experience some setbacks in our personal lives and the group was good at nurturing each other.

The working group members were:

- i. Ms Mmantsae Diale – Unuversity of Pretoria (Chair)
- ii. Prof Diane Grayson – Andromeda Science Education CC
- iii. Dr Igle Gledhill – Council for Scientific and Industrial Research
- iv. Dr Jackie Nel – University of Pretoria- Treasurer
- v. Ms Patience Segonyane – Nuclear Energy Council of South Africa
- vi. Dr Sharmila Goedhart – Hartebeesthoek Radioastronomy Observatory
- vii. Ms Sarah Buchner – Hartebeesthoek Radioastronomy Observatory (Secretary)
- viii. Dr Nnenesi Kgabi – University of North West (Mmabatho)
- ix. Dr Zinhle Buthelezi – ITHEMBA LABS

The working group achieved a special addition to women with PhDs when Nnenesi Kgabi graduated from University of North West in Potchefstroom in Environmental Science, a very important study and relevant to the era.

2. Departmental Launches

In 2006 WiPiSA had a successful year, which saw some universities launching departmental groups of women in physics: University of Pretoria, University of Cape Town, Rhodes University, University of Johannesburg and University of North West (Mafikeng). In each of these departmental launches, each department had a lecture from an invited guest with physics students in the department, followed by a social gathering. This project was successful in each university, with one common result. Physics students ladies gained confidence in continuing with the subject, knowing well that there are potential mentors. A female academic or a senior student in the department of physics led the project. Each project cost about R2, 000.00. The University of Cape Town had a big group, which came from the department of physics and the SAAO

3. Projects

Different institutions have done excellent work in promoting physics among girls through the WIPISA funds. When a call was made [in July 2006] for institutions to send proposals to attract female students into their departments and promote physics in schools, only six universities responded, which may be due to lack of female leadership in physics departments. The following are the universities that were funded, together with the project leader and the cost of the project, followed by a brief report. Full reports are available.

3.1. University of Witwatersrand – Planetarium

Project leader: Dr Claire Flanagan
Project cost: R7, 000.00

The WIPISA funds were allocated to the Planetarium to focus the ASTRO HIT SQUAD (AHS) on the girls. The AHS is an informal grouping of high-school learners who meet at the Planetarium occasionally to do astronomy-based activities. The group sometimes takes telescopes to “viewing sites”. At the moment, this group is totally dominated by boys. The funding has been used to enable the participation of girls.

3.2. University of VENDA

Project leader: Dr Vaith Sankaran
Project cost: R30, 000.00

The project at the University of Venda was aimed at making it possible for rural girls to have a chance to participate in the Vuyani Science Centre activities. The Vuyani Science Resource Centre is located in the rural area and with the outreach activities expected to make a good impact on the local communities. The centre serves as one of the community outreach projects of the School of Mathematics and Natural Sciences of the University of Venda. It consists of laboratories and computer labs, which play an important role in enhancing the rural learners’ perception of science and technology. Since most of the schools do not have any laboratory facilities, they rely on the facilities and services provided by the centre to get hands-on experience in performing the experiments at the centre. WiPiSA funds helped in addressing the need to attract female learners into physics and related areas from the rural areas around the Vuyani region.

3.3. University of North-West – Mafikeng

Project leader: Dr Nnnesi Kgabi
Project cost: R45 000.00

The aims stated below were set to further the WiPiSA aim of ‘Attracting girls into Physics’

- To assist female learners from schools that do not have or that have poorly equipped laboratories by conducting prescribed experiments.
- To establish trends in academic performance of girls at high school To evaluate the impact of experimental activities on girls' performance.

The first and second aims were achieved successfully with a group of Grade 10 learners at Disaneng High School, a rural school in Mafikeng [what was done with the learners?]. Activities are still being carried out to address the third aim. The funding from WiPiSA helped a lot to market the project to an extent that the Department of Education has requested that it be extended further to cover other villages like Lotlhakane and Makgobistadt in the Central region of the North-West province. The project is also considered as one of the interventions to address high failure rate of matriculants in the region.

3.4. Nelson Mandela Metropolitan University

Project leader: Dr Pearl Berndt
Project cost: R29, 500.00

The project entitled Operation Starlight was a Physics-centred weekend excursion to Noorspoort Guest Farm, 180km away from the university. One of the objectives of the project was to provide an opportunity for girls from different backgrounds to exchange ideas on Physics and its relevance in their communities. The project was strategically timed to include as many girls as possible, which have not chosen a career as yet, so that they can be introduced to careers in physics.

3.5. University of Pretoria

Project leader: Dr Jackie Nel
Project cost: R1,063.00

Project Leaders: Dr Jackie Nel and Ms Mmantsae Diale, with assistance from Prof. Diane Grayson – WiPiSA Working Group members and Members of the University of Pretoria Physics Department.

Total Budget: R3772.00

Date: 13 April 2007

The project took place on Friday afternoon at Hans Kekana High School, Hammanskraal. Three female teachers, four male teachers and 85 girl learners took part in the workshop. The project focused on using fun ways to teach the girls about some of the basics of physics (e.g. resistors, circuits and heat transfer) as well as giving them some practical experience in everyday skills (e.g. fitting an electrical plug, fitting an electrical switch in a circuit, using a screwdriver and a pair of pliers). The girls were given an opportunity to make a lamp from scratch, make resistor jewellery and eat ice cream made in front of them without a freezer or a fridge, but using liquid nitrogen.

4. Women's Day celebrations 2006

University of Stellenbosch

Project leader: Dr Gillian Arendse

Project cost: R17, 410.00

In celebration of National Women's day on 9 August 2006, the university of Stellenbosch hosted a project named "Girlz Just Wanna Have Phun" The project aimed at exposing female learners to Physics, and Science related careers, was offered to roughly 100 learners from schools in and around Stellenbosch. The learners were engaged in different group activities such as problem solving, design and manufacture as well as elementary electronics. Even though the organizer at times wondered whether the activities would be "girl-friendly", the learners didn't seem to "mind".

5. Workshop on Building Evaluation into Proposals

Project Leader: Prof Diane Grayson

Cost: R5, 000.00

One of the skills all physicists need, including women, is to be able to write good proposals. Diane Grayson was able to run a successful workshop that focused on one aspect of proposal writing for women in physics, namely how to build evaluation into a proposal. This aspect is important because often the end of a project is reached and it is impossible to collect data post hoc that would show how successful the project was. The work done was very good because as a Physicist herself, she was able to guide researchers in writing winning proposals. Young women entering research considered the workshop as very important, and the attendees included women who were not into physics

6. Baseline Study

Project Leader: Prof Diane Grayson

Cost: R45, 000.00

This project has two parts. Part I comprises the compilation of a database of women who obtained an Honours, Masters or PhD in Physics between 1995 and 2005. It includes women who obtained their degrees in South Africa, South African women who studied overseas, and foreign women who are working in South Africa. Each university Physics Department was asked to appoint a WiPiSA representative. These representatives were then requested to send a list of women who completed post-graduate degrees in their departments between 1995 and 2005. So far a list of 139 women has been compiled, but data is still coming in. In Part II, a selection of women will be questioned to find out if they are working in Physics-related jobs and why or why not.

7. Marketing material for WIPISA

Project Leader: Dr Sharmila Goedhart

Project Cost: R 4,357.00

The first step in our campaign was to design a logo that could be put onto promotional materials. So it has to be something that is bright and appealing to the eye but simple enough to use on documents that may be photocopied in black and white. At the same time it has to represent women, physics and South Africa to reflect the organisation's name. Part of the design element of the IUPAP working group for women in physics was used (the women's heads) to represent women of all ethnic types and reflect our link to IUPAP. The flag and map outline obviously represent South Africa. Selecting a recognisable symbol for physics is more challenging. The South African flag often leads to allusions to rainbows and I also recall the cover of my high school physical science textbook that had a prism refracting white light into a rainbow. So in the logo design the women's heads also symbolise a prism transforming South Africa into its full potential.

A colourful c-fold leaflet with a feminine font and background has been designed to advertise the activities of WiPiSA. Copies of this will be distributed at the SAIP annual conference.

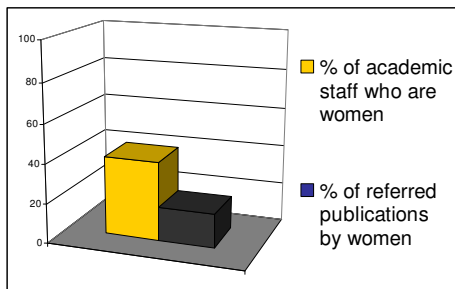
The logo could also be used on t-shirts or bags in future promotional campaigns.

8. IUPAP Representative for South Africa

Dr Igle Gledhill has been appointed as South African representative for the IUPAP working group of Women in Physics. She has attended a meeting of the working group in Germany on 19 - 22 April.

An outline of the progress among Women in Physics in South Africa as presented to IUPAP WG, April 2007.

- Data was collected for South Africa and the SAIP, and is summarised here.
History and context
 - A survey of 2002 revealed concern about physics in late 1990s
 - “Flight of the flamingos”: a report on migration of science, engineering and technology workers
 - SA scientific output halved as a proportion of global output 1987-2001
 - An aging knowledge base
 - Poor representivity



Data from survey of 2002

- Actions were taken in the form of:
 - A review – “Shaping the Future of Physics in SA”
 - Transformation
 - Conscious, and a lot of work
 - An inclination to have fun
 - A high fraction of students at conferences
 - Leaders “*who make sure their successors are not just like them*”
 - Support from Department of Science and Technology
- 2005 was a good year:
 - Year of Physics
 - 50th Anniversary of SAIP
 - First IUPAP General Assembly in Cape Town; first in Africa
 - World Conference on Physics and Sustainable Development in Durban
 - Launch of Women in Physics
- SAIP
 - Membership: 16.5% women at present, based on names, since gender is not explicitly requested on application forms
 - Prizes: women are significantly well represented among best student paper prizes, estimated at about 25%; but award of the Silver and Gold medals to a woman has been rare, and merits attention

- Invitation of women as speakers to the annual conference merits attention
- Significant funding has been made accessible to the community to increase the participation of women in physics
- The projects of WiPiSA were summarised, and
- Preliminary unpublished data from the study of graduate women in physics, 1995 to 2006, is encouraging, but much work remains to be done.

Financial Summary

Treasurer: Dr Jackie Nel

FINANCIAL STATEMENT : WOMEN IN PHYSICS PROGRAMME

INCOME	R	EXPENDITURE	R
DST (2005)	214,000.00	Pre-workshop (travel)	4,654.20
		WiPi Launch :	
		Blue Waters Hotel (package)	91,407.63
		Conference bags, etc.	8,122.50
		Travel	36,587.37
		Planning meeting (Feb 2006) :	
		Tukssport (travel, diverse)	4,185.70
DST (2006)	300,000.00	Surplus (31/3/2006)	369,042.60
		Travel (April meeting)	1,418.00
		TuksSport (April meeting)	1,200.00
		Workshop (Kgabi)	2,700.00
		Travel (June meeting)	1,122.00
		Maths-Science Clinic (travel)	1,450.00
		TuksSport (June meeting)	774.60
		Surplus (30/6/2006)	360,378.00
		Prelaunch work (D Grayson)	8,000.00
		Travel (July meeting)	180.00
		Travel (July meeting)	1,541.50
		Tukssport (July meeting:travel)	300.00
		<u>Girls in Physics program :</u>	
		University of Venda	30,000.00
		University of Stellenbosch	17,410.00
		Jhb Planetarium	7,000.00
		Travel (Oct meeting)	1,371.50
		Surplus (30/09/2006)	294,575.00
		<u>Girls in Physics program :</u>	
		University of Mmabatho	45,500.00
		NMMU	29,500.00

		Launch costs (MW Diale)	11,650.00
		Travel (July meeting)	1,126.00
		WiPiSA Dept Launch NWU	2,238.20
		Surplus (31/12/2006)	204,560.80
		Andromeda Workshop	5,716.80
		Travel (February meeting)	1,124.00
		WiPiSA Functions :	
		University of Pretoria	1,063.75
		SAAO	3,642.96
		Surplus (31/03/2007)	193,013.29
		Baseline study (Andromeda)	47,800.00
		Unibrooks B&B (Meeting)	1,965.00
		Irene Quist Photography	2,500.00
		Workshop for Girls (UP)	5,078.51
		Surplus (31/05/2007)	135,669.78
		Unibrooks Lunch and meeting	510.00
		Rhodes Launch Function	290.00
		Marketing Material	4,357.70
		Surplus (30/06/2007)	130,512.08
	514,000.00		514,000.00

Conclusions

WiPiSA has had a very successful year. Through the grants made to run projects and host social gatherings at university Physics Departments, the number of people and activities associated with WiPiSA is growing.

- Recommendations:

The WiPiSA working group recommends that the project be given the last year to run with the same funds to complete a three year cycle, which becomes a proper statistical instrument to qualitatively evaluate the project. Furthermore, the project reports from universities and additional material available from women in physics project may be put together to publish a book on the activities of women in physics in South Africa, using the same funds

- Acknowledgements

The WiPiSa work has been made successful by the dedication of the WiPiSA working group. The leadership of Mmantsae Diale was fully supported by members of the working group, the president of SAIP, Prof Harm Moraal and the DST Project manager, Dr Tshepo Seekoe and his team.

M. Diale, D. Grayson, J. Nel, I. Gledhill, S. Goedhart,