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Quarterly Update of the work and progress of the Postgraduate Institute of Science (PGIS), University of Peradeniya, SRI LANKA

PGIS News

We shall be pleased to receive your comments, suggestions and contributions with a view to improving the quality of this newsletter. Correspondence and requests for copies of PGIS News should be addressed to Dr. N C Bandara – Editor:
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FIRST PGIS RESEARCH SESSIONS

His Excellency Herr Juergen Elias, Ambassador of the Federal Republic of Germany, Chief Guest, addressing the participants at the Inauguration Ceremony of the Research Sessions.

The First PGIS Research Sessions were held at Peradeniya from September 7 – 8, 2002. There were more than 200 registered participants at the Sessions. His Excellency Herr Juergen Elias, Ambassador of the Federal Republic of Germany was the Chief Guest at the Inauguration Ceremony of the Research Sessions. Prof. K. Dahanayake (Director, PGIS) delivered the welcome address. Prof. K. G. A. Goonesekera (Vice Chancellor, University of Peradeniya) and Prof. S. A. Kulasooriya (Dean, Faculty of Science) also addressed the gathering. At these sessions, keynote addresses were delivered by two eminent Sri Lankan scientists, Professor M. D. Dassanayake (Emeritus Professor, Department of Botany, University of Peradeniya) and Professor Kirthi Tennakoon (Director, Institute of Fundamental Studies, Kandy). Guest Lectures were given by Mr. Lal de Alwis (Managing Director, Chemanex Ltd., Colombo) and Dr. Nanda Fernando (Director – Research & Development, Unilink International Pvt. Ltd., Colombo). The public lecture was delivered by Eng. M W P Wijesinghe (Chairman, Water Resources Board, Colombo).

At this forum, postgraduate students and staff members presented papers based on their research findings. Prior to the sessions, these papers were refereed nationally and internationally and were published as two special volumes of the Ceylon Journal of Science (CJS) – Volume 30, 2002 (Biological Sciences) and Volume 9, No. 1, 2002 (Physical Sciences) (Vide page 12 for details). Dr. Kushan Tennekoon and Prof. Gamini Rajapaksa served as Guest Editors of these volumes which were distributed during the Research Sessions.

TEACHING SCIENCE, THE INTERACTIVE WAY……

Traditional methods for teaching science courses at the post-secondary level usually employ a format of instruction in which the majority of students are passively listening to the instructor and jotting down notes. Recent research on learning and instruction challenges the wisdom of this traditional pedagogic practice by stressing the need for the learner to play an active role in constructing knowledge. The astounding revelation by two US Physicists - Halloun and Hestenes - in 1985 was that most students could complete and pass an entire course on Physics at a major university and still have little understanding of the basic concepts on which the subject depends. This work has since been verified at a cross-section of educational institutes from high schools to premier universities like Harvard. Several independent studies have shown that students' misconceptions are deeply rooted, and have developed over a very long period of time, and consist of incorrectly interpreted personal experiences and observations. Physics education research has shown that, as a result of these deeply held misconceptions, students' understanding and hence appreciation of very basic Physics concepts cannot be greatly improved by traditional instruction. However, the quantification and analysis of student misconceptions have led to the development of more effective methods of instruction based on the constructivist model of student thinking and learning. A common factor for all these innovative teaching techniques is that they actively

engage students in the learning process. These are commonly called "active engagements" or "interactive learning techniques". There is considerable evidence to show that these active learning techniques are far superior to traditional teaching methods for improving students' understanding of basic scientific concepts at both secondary and tertiary levels. However, it should be emphasized that, interactive teaching methods that make use of lecture demonstrations and computer aided instructions do not necessarily guarantee improved understanding of scientific concepts unless they are carefully designed as student-centred learning strategies that encourage active participation of the student in the learning process.

The active learning perspective has three underlying assumptions: (i) learning, by its very nature, should be an active process, (ii) different people learn in different ways, and (iii) learning is only meaningful when the learners discover knowledge by themselves and make it their own. Thus, to create an active learning environment inside the classroom, the instructor's facilitating technique should accommodate a diverse range of student learning styles and encourage students to interactively engage in the learning process. Such a learning technique should provide ample opportunities to constantly challenge students' misconceptions of very basic scientific concepts.

In an active learning environment, the instructor ceases to be the source of all knowledge but rather assumes the role of a facilitator who guides the student through the learning process. The active learning environment can even be a challenge to the instructors. With active learning, the students, who are the focus of concern, cease to be mere receivers of information from the instructor. With the instructor as the guide, they are presented with numerous opportunities to predict, experiment, observe, discuss, explain, and exchange ideas with their peers and also with the instructor. They are encouraged to work in teams or groups and participate in various activities such as interactive computer-based as well as non-computer based experiments, interactive lecture demonstrations performed by the instructors, interactive computer simulations, and interactive problem solving. These activities should be carefully prepared so that they always simulate the students to think, predict, observe, compare and reason.

Often, adopting these interactive learning methods can pose problems to the instructors due to limited resources available at their disposal. Therefore, the teachers need to be creative and innovative if they are to implement active learning strategies. Over the past few years, the Asian Physics Education Network (ASPEN) has been working in association with UNESCO to introduce these interactive teaching methods for Physics teaching in ASPEN member countries. This has been done by conducting national, regional and international workshops on Physics Education. These active learning techniques can also be successfully adopted for teaching Chemistry, Biology and Mathematics as well if teachers are genuinely interested in students' learning of the subject matter and are prepared to take up the challenge.

Prof. M A K Lakshman Dissanayake
Chairman, Asian Physics Education Network (ASPEN) &
Chairman, PGIS Board of Study in Science Education

Degrees Awarded and Titles of Theses (July 2002 – March 2003)

M.Phil. (Chemical Sciences)	
C.S. Liyanage	Studies on some medicinal and related plants of Sri Lanka
T. Sothyrupan	Synthesis of aggregation pheromone of black beetle and synthetic studies on 1,6–germacradien-5-ol
M.Phil. (Plant Sciences)	
E.M.J.M. Rizvi	Effect of some carbon substrate supplementation, on associative dinitrogen fixation of rice

K.B. Wijesekara	Study of microsporogenesis and haploid induction in selected species of Theaceae and Solanaceae
M.Sc. (Analytical Chemistry)	
D.H.L.W. Jayamanna	Pesticide residue analysis on tomato, brinjal and cabbage
D.M.S. Jerard	Qualitative and quantitative estimation of (a) Glycyrrhetic acid in liquorice (b) Methimazole in carbimazole by using Plasma Desorption Mass Spectrometry (PDMS) and High Performance Liquid Chromatography (HPLC)
E. Mathialahan	Isolation and characterisation of the factor, present in Ginger, which reduces cow milk allergy
M.M.M. Muhajireen	Development of environmentally friendly methodologies for control of industrial pollution
M.Y.M. Nisa	Investigating the effect of selected macro- and micro-nutrients on biological treatment systems adopted by Sri Lankan textile industry
P.N. Siriwardana	Quantification of anionic surfactants in effluent of Effluent Treatment Plant of Garment Washing Industries
M.Sc. (Applied Statistics)	
K. Gunasingam	Modeling the demand for Sri Lankan Air Line by using time series analysis
R.P. Pathirage	Analysis of contingency tables with multiple responses – special emphasis on three–way tables
M.Sc. (Chemical Ecology & Pesticide Chemistry)	
H.M.L.K. Amarawardana	Determination of neutral sugar composition of tea clones TRI – 3015, TRI – 3019 and TRI – 4078
B.G.S. Arundathie	Chemistry and bioactivity of Diploclisia glaucescens and Elaeocarpus serratus
M.M.S. Bogamuwa	Insecticide tolerance in the bruchid Callosobruchus maculatus
I.W. Goonesekera	Chemical Investigation of Litsea ovalifolia
T.R.W. Thambugala	Effect of sunlight, soil nutrient status and original establishment on the chemical composition of P. longum
R.D.P.D. Senanayake	Effect of root polyphenols and amino acids on nematodes in tea
M.Sc. (Computer Science)	
K.A.C. Ariyawansa	Generation of visual characteristics of humonoid robots using a graphics animator
W.P.E. Priyadarshani	Mesh Network for Software process Modeling (MNSM)
M.Sc. (Environmental Science)	
N.H. Eramudugolla	A study on the levels of chlorpyrifos in dry zone water sources and their potential health effects
P.G.I. Jayasekara	Waste water of vehicle service stations - quantitative analysis and a method of treatment
T.H. Rasangika	The investigation of the use of laterite for removal of Ag + from aqueous medium
M.Sc. (Industrial Chemistry)	
A. Ashraff	Measurement of fluoride ions in drinking water
U.M.R. Widurusinghe	Analysis of a commercial fertilizer
M.M. Samoon	Waste human hair as an oil recovery material
M.Sc. (Physics of	

Materials)	
M.S.M. Aliyar	A study on setting time of cement
M.Sc. (Postharvest Technology of Fruits & Vegetables)	
P.H.J.C. De Silva	Effect of postharvest treatments on the shelf life of Mauritius pineapple (Ananas comosus L. Merr.)
M.Sc. (Science Education)	
D.C. Bodiabadu	Development of rapid and cost effective propagation techniques for two medicinal plants, Cyperus rotundus (Kalanduru) and Phyllanthus debilis (Ela Pitawakka)
N.S.D. Mayadunne	Preparation of a guide for G.C.E. A/L biology students to teach assessment of soil erosion by using simple methods
J.S. Nooraniya	An investigation of misconceptions in chemical equilibrium among G.C.E. (A/L) students: the impact of practical classes in eliminating such misconceptions
K.B.A. Vitharana	Novel experiments for teaching Advanced Level Physics
W.J. Weerasinghe	Potential applications of Rupaha marble rock

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Abstracts of M.Phil. and Ph.D. Theses

M.Phil. (Chemical Sciences)

Studies on some medicinal and related plants of Sri Lanka

C.S. Liyanage, Department of Chemistry, University of Peradeniya

This thesis describes the chemical investigation of some medicinal and related plants of Sri Lanka. The biological activities of some constituents/extracts/fractions are also discussed.

Two Annonaceous plants, Cananga odorata (Sin.Wana-sapu) and Enicosanthum acuminata (Sin. Wal-waraka, mal-lawulu), two Rutaceous plants Acronychia pedunculata (Sin. Ankenda) and Euodia lunuankenda (Sin. Lunu-ankenda) and the Labiatae plant Leucas zeylanica (Sin. Geta-thumba) were investigated in this study.

The alkaloidal fraction of the stem bark of Cananga odorata yielded six alkaloids of which five were identified as oxopukateine, cleistopholine, onychine, eupolauridine and liriodenine. This alkaloidal fraction was shown to possess very weak cytotoxicity to Brine shrimps.

The methanol extract of Enicosanthum acuminata stem bark yielded a clerodane diterpenoid and the aporphine alkaloid liriodenine. This clerodane diterpenoid showed weak mosquito larvicidal and weak cytotoxic (Brine shrimp) activities.

The petroleum ether extract, of the fruits of Acronychia pedunculata yielded a new arylketone dimer, demethylacrovestone.

The dichloromethane extract of the fruit shells of Euodia lunuankenda yielded a new acetophenone,1-[4'-(3"-methyl-2"-butenyloxy)-3'-(3"-methyl-2"-butenyl)-2',6'-dihydroxyphenyl]-2-hydroxyethanone, which showed strong antifungal activity against Cladosporium cladosporioides.

The root extract of Leucas zeylanica yielded ?–sitosterol, ursolic acid and its methyl ester acetate while the extractives of aerial parts yielded the flavonoid – tricin, ?-sitosterol glucoside, oleanolic and ursolic acids. These extracts did not show any significant biological activity.

Supervisor: Prof. V. Kumar (University of Peradeniya & PGIS)

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**M.Phil. (Chemical Sciences)**

**Synthesis of aggregation pheromone of black beetle and synthetic studies on 1,6–germacradien-5-ol**

**T. Sothyrupan**, Department of Chemistry, University of Peradeniya

This thesis consists of two parts.

The first part describes the total synthesis of the aggregation pheromone of the coconut rhinoceros beetle, Oryctes rhinoceros. Although the pheromone has been identified as S-ethyl 4-methyloctanoate, the racemic mixture has been shown to be as effective in attracting the beetle. Three methods of syntheses were derived from a retrosynthetic analysis of the molecule. Of the three methods selected, the cheapest starting material and the shortest route was found to be that starting from cane sugar. The first step in this sequence involved the acid degradation of cane sugar by hydrochloric acid giving levulinic acid. Levulinic acid was converted into its ethyl ester by Fischer esterification. Wittig olefination of ethyl levulinate followed by catalytic hydrogenation resulted in the target molecule, ethyl 4-methyloctanoate being synthesized in its racemic form.

The second part of this thesis describes synthetic studies on a semiochemical, 1,6-germacradien-5-ol present in the defence effluent of pine sawfly. The stereochemistry of this germacrane and its role in the defence mechanism of pine sawfly are unknown. The molecule has two chiral centers and two transgenic double bonds. A method to synthesize all four stereoisomers by the same common route was developed on the basis of retrosynthetic analysis. The proposed method involved joining together of two key fragments, an aldehyde and phosphonium salt or arylalkyl sulfone using stereoselective olefination methods (Wittig reaction and Julia olefination) in order to synthesize an open chain diene, which is the precurser for ring closure. The final ring closure could be accomplished by a ring closing metathesis. The Wittig reaction approach was abandoned as an attempt for ring closing metathesis using a Wittig salt and an aldehyde with a hydroxyl group protected as methyl ether, which had previously been attempted had failed for what was suggested to be stereochemical reasons. The present work was an attempt to synthesize the open chain diene using Julia olefination with the hydroxyl group in the aldehyde fragment protected with a bulky group. However, all attempts to introduce bulky ether failed and the only protection possible was in the form of a acetate ester. Although both fragments for the Julia olefination were synthesized, time constraints prevented the ring closing methasis being carried out.

**Supervisor:** Prof. V. Kumar (University of Peradeniya & PGIS)

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M.Phil. (Plant Sciences)

Effect of some carbon substrate supplementation, on associative dinitrogen fixation of rice

E.M.J.M. Rizvi, Department of Botany, University of Peradeniya

Rice is the staple food in Sri Lanka and of a large proportion of the world population. Nitrogen is a major limiting factor that affects rice yield. Fertilization with chemical N in wetland rice is associated with various problems mainly inefficient use of it by the plant resulting in a loss into the environment leading to pollution. A good way for the synchronous supply of at least a part of the N requirements of rice plants is associative Biological Dinitrogen Fixation (BDF). However, for this fixed N to contribute to high yields the efficiency of BDF must be improved. One of the factors with regards to inefficiency of associative BDF is the limitation of C substrates in the rhizosphere for the

diazotroph to continuously support the plant.

Rice variety BW 267-3 and Azospirillum irakense KBC1 association was selected, based on in vitro inoculation experiments of various rice-bacterial combinations. This strain supported this rice variety probably via contribution of fixed nitrogen. Hence this plant-bacterial combination was used for further studies. The bacteria strain was initially tested for its competitiveness with native diazotrophs in supporting the host plant using a pot experiment. High rates of inoculum were given by repeated inoculation under competitive and non-competitive soil conditions (un-autoclaved and autoclaved soils, respectively). An inoculation effect was found in non-competitive soil conditions indicating a low competitivity of the strain. However, the bacterial density reduced drastically indicating inadequacy of C substrates for the strain to survive.

The effect of the C substrate supplementation was tested under in vitro and greenhouse conditions. Malate was used as a pure C substrate for in vitro studies. No significant effect of malate was found on Azospirillum strains in their associative BDF. Rice straw (3t ha-1) was tested as the C substrate on A. irakense KBC1- rice variety BG 94-1 association in a pot experiment using 15N dilution technique. An additional contribution of ca. 3kg N ha-1 to the above ground plant parts by straw supported fixation of the strain was detected. The straw supported total BDF contribution to the whole rice-soil system in the pots was estimated to be 13 kg N ha-1. Also this study revealed that inoculated strain has utilized straw efficiently than the native diazotrophs for their BDF. Thus by employing suitable diazotroph-plant-C substrate as straw combination under controlled conditions, the benefits of the associative BDF could be increased. The potential for a positive contribution of associative BDF was shown in this preliminary investigation. Therefore, long-term trials must be carried out to study the performance of such combinations.

Supervisor: Prof. S. A. Kulasooriya (University of Peradeniya & PGIS)

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**M.Phil. (Plant Sciences)**

**Study of microsporogenesis and haploid induction in selected species of the Theaceae and Solanaceae**

**K.B. Wijesekara**, Plant Reproductive Biology, Institute of Fundamental Studies (IFS), Kandy

Microsporogenesis in selected plants species such as, Gordonia dassanayakei, Camellia sinensis, Datura metel and Solanum pseudocapsicum was studied prior to attempting haploid induction. A deviation from normal pollen development was observed in two Gordonia species of the family theaceae. Here, some pre-determined parenchymatous cells in the connective tissues underwent cell differentiation to produce pollen-like structures (described as pseudopollen). Pseudopollen developed inside a separate sac situated between the true pollen sacs and development was concomitant with the normal pollen development. At maturity they migrated into pollen sacs and mixed with the normal pollen.

When cultured in vitro, immature pollen or microspores can be triggered to undergo repeated divisions leading to the formation of haploid embryos and later haploid plants. The response of cultured microspores is determined to a large extent by the genotype of the donor plants, stage of microspore development, pre-treatments, culture media composition, growth regulators and the culture conditions.

Anthers cultured at mid to late uninucleate stage resulted in high anther response (82%) and highest mean embryos per responded anther (37%). Presence of kinetin in the culture medium (1.0 mg/L) favored microspore embryogenesis and post-induction embryo development.

In this study, a novel temperature pre-treatment was studied. Anthers were subjected to a temperature gradient of high and low temperatures in quick succession. This simple technique had a significant impact on pollen embryogenesis and there was an apparent relationship between the temperature gradient and the embryo yield. When the temperature gradient was large (45?+10? C and 40?+10? C) more embryos were produced while at smaller gradients (40?+15? C and 35?+10? C) embryo production was also reduced.
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Selected solanaceous species were screened for their androgenic ability. Haploids were obtained with Solanum pseudocapsicum in this study and this could be the first report of successful induction of haploids in this species.

Since haploids have only a single set of chromosomes there is a high possibility of mutants and recessives to be expressed. Some of these mutants will result in severe abnormalities in the basic body plane of the embryo. This study surveyed such abnormalities in microspore derived embryo progeny. Results suggested that, embryo/seedling development in higher plants follows two patterns: apical-basal and radial. Two superimposing processes establish these two patterns in the early stages of embryo development. Four pattern deletions, apical, basal, central and terminal were found affecting the elements of the apical-basal patterning of the embryo. Deletion of shoot apical meristem, cotyledons, hypocotyl and root apical meristem resulted in abnormal embryo/seedling phenotypes. The defective embryonic pattern formations are substantiated by cytological sections of the embryos.

Spontaneous secondary embryogenesis was observed in the hypocotyl region of apical and terminal deleted microspore derived embryos. These embryos emerged after the cessation of growth of the primary embryos. Cytological studies revealed that secondary embryos originated from sub-epidermal cells in the hypocotyls and followed a developmental sequence similar to zygotic embryogenesis. An enhanced production of secondary embryos was achieved when primary embryos were mechanically wounded to remove apical meristems. Absence of apical meristems and the stimulation caused by the injury during the removal of meristems seem to induce secondary embryos in primary embryo explants. Presence of light and kinetin favored induction and growth of secondary embryos. The combination of meristem removal with kinetin and light resulted in the highest number of secondary embryos per responded explant.

Supervisors: Dr. M. C. M. Iqbal (IFS, Kandy)
Dr. K. U. Tennekoon (University of Peradeniya & PGIS)

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### M.Sc. Programmes offered by the PGIS

- Analytical Chemistry
- Applied Statistics
- Biodiversity Conservation Management
- Chemical Ecology and Pesticide Chemistry
- Clinical Biochemistry
- Computer Science
- Engineering Geology and Hydrogeology
- Environmental Science
- Experimental Biotechnology
- Fish and Wildlife Management
- Gemmology
- Industrial Chemistry
- Idustrial Mathematics
- Medical Physics
- Oceanography
- Parasitology
- Physics of Materials
- Plant Sciences
- Postharvest Technology of Fruits and Vegetables
- Science Education

**PGIS entertains applications from Sri Lankan and foreign students for admission to its M.Sc., M.Phil. and Ph.D. programmes. For details, please visit our website: http://www.pgis.lk or contact Programme Coordinator (Phone: +94 8 385669; *E-mail: proco@pgis.lk).***

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## ADB SCHOLARSHIP RECIPIENTS

List of Recipients of Scholarships Granted by the S & T Personnel Development Project of the Ministry of Economic Reform, Science and Technology
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M.Sc. in Analytical Chemistry 2001/2002

Ms. S Balagowry
Mr. W M N Gunawardena
Mr. J Jeyatheepan
Ms. U Kanagarathnam
Mr. M Koneswaran
Ms. K A D Padma Prasangi
Ms. R Sinnatamby
Ms. T R D S K Tennekoon
Ms. R Thangarajah
Mr. W M S C Wanasinghe
Ms. W M P B K Warnasooriya
Ms. D P P Weerasinghe

M.Sc. in Environmental Science 2001/2002

Ms. A M N Abeysinghe
Ms. S P Indrasena
Mr. J P Jayasinghe
Mr. Y M K R Senevirathne
Ms. G Subramaniam
Mr. E Surendranathan
Ms. K Thayaseelan
Ms. J Theivathavapalan
Mr. W M A S R Wijekoon
Mr. P S Yahampath

M.Sc. in Oceanography 2001/2002

Ms. H A K S Ariyaratne
Mr. D K A P Dassanayake
Mr. H M U B Herath
Mr. W M M Lasantha
Mr. M S P K Malaviarachchi
Ms. K P Ranaweera
Ms. A U Senanayake
Mr. H M U B Herath

M.Sc. in Experimental Biotechnology 2002/2003

Mr. M M T P Bandara
Ms. D C Hettiarachchi
Mr. T Kariharan
Ms. C R V P Samarasekera
Ms. H I Sandanayake
Ms. M A R Sepali
Ms. N S Tennekoon
Ms. B D S Tissera
Mr. K A D R Vishwajith
Ms. M C Vitharana
Ms. W A P G Weeraratne
Mr. W A I Wijeratne

M.Sc. in Analytical Chemistry 2002/2003

Ms. A M A S K Abeykoon
Ms. J M D Abeysinghe
Ms. A M T S Attanayake
Ms. I M N Fernando
Ms. M V Gamlathge
Ms. W D S Gunathilaka
Mr. C D Jayasinghe
Ms. J K B M Jayawardane
Ms. R M C P Karunaratne
Ms. W E U Malewana
Ms. W A M Nishanthi
Mr. S Suthakaran
Ms. P N L Thilakaratne
Ms. J Vathamy
Ms. K B Wijewardena

M.Sc. in Environmental Science 2003/2004

Ms. B U G A K Abeywardhana	Ms. J G Hennayake
Ms. M C K Abeyratne	Ms. M Kanagarathnam
Ms. K D T N Abeywardena	Ms. S Kandasamy
Ms. A J K Aluthge	Ms. V P N K Kulathunga
Ms. L A W D Ariyadasa	Ms. S H A S Kumari
Ms. P H D A Ariyawardena	Ms. K M M W C K Narampanawa
Mr. R M M D Bandara	Ms. R H C Priyanthi
Ms. J U Champa	Mr. M A S S Silva
Mr. V Chandrasegaran	Mr. U Uthayasrithar
Ms. C D M S Dissanayake	Ms. M S Vithanage
Ms. S Gothandaraman	Ms. C N B Wijerathne

M.Sc. Programmes commenced during July 2002 – March 2003

M.Sc. Programme	Board of Study	Coordinators	No. of Students
Analytical Chemistry	Chemical Sciences	Dr. A Bandara	16
Applied Statistics	Statistics & Computer Science	Dr. P Wijekoon	16
Experimental Biotechnology	Biochemistry & Molecular Biology	Dr. P Amerasinghe Dr. K Fernando Dr. D Yakandawala	13
Industrial Mathematics	Mathematics	Dr. A A I Perera	12
Science Education (with specialities in Biology, Chemistry, Mathematics & Physics)	Science Education	Dr. S Karunaratne (General Component) Dr. A Perera (Biology Component) Prof. J S H Q Perera (Chemistry Component) Dr. U N B Dissanayake (Mathematics Component) Prof. M A K L Dissanayake (Physics Component)	40
Environmental Science	Environmental Science	Prof. K H G M de Silva Dr. R Fernando	25
Physics of Materials	Physics	Prof. B S B Karunaratne	14

Presentations at PGIS Research Sessions 2002

Keynote Addresses

• Plant Systematics at Peradeniya
Prof. M.D. Dassanayake

• Dye-Sensitized Semiconductor Nanostructures for Solar Energy Conversion
Prof. Kirthi Tennakone

Public Lecture

• Water Resources of Sri Lanka – Present Status and Future Trends
Eng. M W P Wijesinghe

Guest Lectures

• 5S Management in Sri Lankan Industry
Mr. Lal de Alwis

• Recent Developments in the Rubber Product Manufacturing Industry in Sri Lanka
Dr. Nanda Fernando

Papers (Biological Sciences)

1. Growth of Rice variety BW 267-3 as affected by Diazotrophs, inoculated under different conditions
E.M.J. M. Rizvi and S. A. Kulasooriya

2. Bee Diversity and floral hosts in selected habitats of the Peradeniya University Park
W.A.I.P. Karunaratne and J.P Eidrisinghe

3. Climate of Sinharaja rain forest in Sri Lanka: An attempt to understand the el Nino and la Nina events
B.K.H.C. Munidasa, C.V.S. Gunatilleke and I.A.U.N. Gunatilleke

4. Insecticide resistance in the bruchid Callosobruchus maculatus, a storage pest of Legumes
M.M.S. Bogamuwa, K.C. Weerakoon and S.H.P.P. Karunaratne

5. Studies on propagation, optimal growth conditions and fruit formation of the medicinal plant Piper longum L.
E.R.L.B. Etampawala, K.U. Tennakoon, C.V.S. Gunatilleke and I.A.U.N. Gunatilleke

6. Marine turtle conservation in Rekawa turtle rookery in southern Sri Lanka
E.M. Lalith Ekanayake, K.B. Ranawana, T. Kapurusinghe, M.G.C. Premakumara and M.M. Saman

7. Cytological aspects of pollen embryogenesis in Anther Culture of Datura metal L
Kolitha Bandara Wijesekara and M.C.M. Iqbal

8. Impact of lunar cycle on nesting behaviour of marine turtles
E.M. Lalith Ekanayake, K.B. Ranawana, T. Kapurusinghe, M.G.C. Premakumara and M.M. Saman

9. Structure and composition of scrubland vegetation in the lower Walawe basin irrigation extension area in Sri Lanka
M.A.A.B. Dilhan, D. Yakandawala, C.V.S. Gunatilleke and C.N.B. Bambaradeniya

10. Performance and Characterization of promising cardamom (Elettaria cardamomum Maton) accessions at high and low altitudes of Sri Lanka A.L.S. Dharmaparakrama, I.H.M.H.B. Herath, H.M.P.A. Subasinghe, C.V.S. Gunatilleke and I.A.U.N. Gunatilleke

11. Biodiversity associated with a nature trail at Ambuluwawa forest in Gampola
W.M. Kusumawathie and J.P Eidrisinghe

Papers (Physical Sciences)

1. Ionic Conductivity of (PEO)9LITFSI:Al2O3 Nano-Composite Polymer Electrolyte Prepared by Solvent-free Route
P.A.R.D. Jayathilake, M.A.K.L. Dissanayake, I. Albinsson and B.-E. Mellander

2. Multi-layer Polyaniline Assemblies in Bentonite Clay
J.S.H.Q. Perera, R.M.G. Rajapakse, D.T.B. Tennakoon, C.H. Manoratne, D.M.M. Krishantha and M.V.K. Perera

3. Role of weak soils and Relict geological discontinuities in creeping Slope failure at Pooliyadda, Sri Lanka
Udeni B. Amerasinghe, K. Dahanayake and N. Seneviratne

4. Polypyrrole/Dodecylbenzenesulphonate based Artificial Muscles and their Behaviour
K.P. Vidanapathirana and M.A. Careem

5. Chemical Modification of Polyethene and Immobilization of Conducting Polyaniline
J.S.H.Q. Perera, D.T.B. Tennakoon, R.M.G. Rajapakse, A. Bandara and J.K.K. Weerasinghe

6. Time dependence of area coverage of the nth layer during thin film Growth at Low Temperatures
R.P.U. Karunasiri

7. Monitoring Air Pollution Levels in Kandy using Passive and Active Gas Sampling Techniques
Oliver A. Ileperuma and Vilani D.K. Abeyratne

8. Enhanced Densification of In2O3:Sn (ITO) Ceramics Prepared from Hydrothermally Derived Sn Doped Indium Hydroxide Powder.
C. P. Udawatte and K. Yanagisawa

9. Electrical Properties of Zircon Ceramics Doped with Different Dopants
U. Dahanayake and B.S.B. Karunaratne

10. Electrical relaxation in some PEO based Solid Polymer Electrolytes
L.R.A.K. Bandara and M.A.K.L. Dissanayake

11. Development of an Opto-chemical Sensor for the Detection of Cu2+ ions in Aqueous Solution
H.M.N. Bandara, J.S.H.Q. Perera, D.T.B. Tennakoon, R.M.G. Rajapakse, S.D.S. Jayatissa, A.N. Ilangatilaka and G.R.U. Jayasuriya

12. Porphyrin-coated Metallic Electrodes for Determination of Chlorinated Pesticides
N. Priyantha and U.S.K. Weliwegamage

13. Classification of State Schools in Sri Lanka: A multivariate approach
S.S.K.B.M. Dorabawila, S. Samita and R.O. Thatil

14. Structural Analysis of a Xylan from Tea Stems and Xylanase Activity of the Ambrosia Fungus.
Nivandana K. Bandaranayake, Thushari Bombuwala, N. Savitri Kumar and K.M. Swarna Wimalasiri

15. Geophysical Exploration for Raw Matterials in the Aruvakalu Limestone Reserve
A.Senaratne and H.A. Dharmagunawardena

Poster Presentations (Biological Sciences)

1. Effect of different propagule types, growing media and rooting hormones on initial sprouting of the medicinal plant Cyperus rotundus L
K.K.S.K. De Alwis, K.U. Tennakoon, C.V.S. Gunatilleke and I.A.U.N. Gunatilleke

2. Land snail diversity in Sri Lanka
K.B. Ranawana, D. Raheem and Fred Naggs

Abstracts (Biological Sciences)

3. Converting organic waste through vermicomposting for sustainable agriculture in Sri Lanka
J. Samaranayaka and S. Wijekoon

4. Assessing the quality of water at the Kalu Ganga bay area: A guide to improve environmental awareness of A/L biology students
J.S. Senanayake and G.A.D. Perera

Poster Presentations (Physical Sciences)

1. Novel Method for the Synthesis of Polyaniline and its Applications in Liquid Crystal Display Technology
A.D.L. Chandani Perera, R.M.G. Rajapakse and U.I. Makavite

2. Understanding Chemical Bonds: A Novel Approach
A.R.G.A.M. Abeykoon Manike and S. Karunaratne

3. Developing science process skills at primary school level
P.R.K.A. Vitharana and S. Karunaratne

PGIS RESEARCH GRANTS 2003

Principal Investigator/s	Title of the Project
Phase I (March – December 2003)	
Dr. K.U. Tennekoon	Development of Agronomic Practices for Cultivating the Medicinal Plant Phyllanthus debilis Klein Ex Willd.
Prof. M. de Silva	Diversity and distribution of Molluscs in Estuaries and associated mangroves in the Puttalam & Negombo areas, and the importance of these molluscs to local people
Prof. M.A.K.L. Dissanayake	Preparation and characterization of some polymer electrolytes based on PEO, PAN and PMMA
Prof. B.S.B. Karunaratne	Development of ZrSiO4 based ceramics for functional and structural applications
Prof. M.A. Careem & Dr. R.L.N. Chandrakanthi	Application of Conducting polymers in artificial muscles and Solar cells
Dr. S.W. Nawaratne	Gold mineralization in Sri Lanka
Dr. D.M.D. Yakandawala	Preparation of a Supplement of Botanical Terms for the Flora of Ceylon & Taxonomical Studies on Sri Lankan Juncus (Juncaceae)
Prof. J.P. Edirisinghe	Bees and their Floral Host
Dr. S. Karunaratne	Capacity Building in Science Teachers at Primary & Secondary Levels in Schools of Sri Lanka
Phase II (April – December 2003)	
Dr. K.	Induction of oral cancers and precancerous lesions using areca extract in mouse: Development of an

Kaluarachchi	animal model to study oral cancers and precancerous lesions and their therapeutic management
Dr. J.G.S. Ranasinghe	Characterization of Venom of Sri Lankan Snakes
Ms. V. Santhanam Mr. A.K. Wickramasooria	Preparation of a Geographical Information Systems (GIS) atlas for the Ampara District
Prof. R. Sivakanesan	The effect of feeding probiotics along with prebiotics on serum lipid levels in hypercholesterolaemic rats
Dr. H.M. Nasir	Solutions of scattering wave equations
Dr. D.M.D. Yakandawala	Fresh Water Plants of Sri Lanka
Dr. W.A.M. Daundasekera	Effect of 1-methylcyclopropene on ripening of Sri Lankan “Embul” bananas (Musa sp.)
Dr. P Ekanayake	Multiple-wavelength measurement of light transport in tissues
Dr. P.W.S.K. Bandaranayake	Simulation and modeling of conductivity and other physical properties in materials
Prof. P.K. de Silva Mr. C. Wijesundara Ms. S. Kumburegama Ms. U. Samarakoon	Taxonomy and distribution of marine and freshwater fishes of Sri Lanka
Dr. P. Saravana Kumar	Genetic relationship and Geographic distribution of some cultivated and its wild relatives of Vigna (Black gram and Green gram) and Cajanus (Pigeon pea) species

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FORTHCOMING EVENTS

• 3 - Day Short Course Buffet on Computer Applications and Statistics (May 9 – 11, 2003)

• Commencement of the following M.Sc. programmes: (May 2003)

- Fish & Wildlife Management
- Industrial Chemistry
- Medical Physics
- Parasitology
- Plant Sciences

• Short Course on Computer Mathematics for University Academic Staff (May/June 2003)

• Workshop on Scientific Writing (June 2003)

FOREIGN VISITORS (July 2002 – March 2003)

• Adam Price, School of Biological Science, University of Aberdeen, Aberdeen AB 24300, UK

• Ms. Anna Searle, Deputy Director, British Council, Colombo
• Fred Naggs, Department of Zoology, The Natural History Museum, London, UK
• Dr. I. M. Dharmadasa, School of Science & Mathematics, Sheffield Hallam University, UK
• Dr. Minella C. Alarcon, Programme Specialist for Physics & Mathematics, Division of Basic & Eng. Sciences, Science Sector, UNESCO, 1 rue Miollis 75015 Paris, France
• Prof. Richard R. Hake, Emeritas Professor of Physics, Indiana University, 24245, Hatteras Street, Woodland Hills, CA 91367, USA
• Prof. David Sokoloff, Professor of Physics, Department of Physics, 1274 University of Oregon, Eugene, OR 97403 – 1274, USA
• Prof. Diane Grayson, Professor of Science Education, Faculty of Science, P.O. Box 392, UNISA 0003, South Africa
• Prof. Keum – Hwi Lee, Department of Physics, Chonbuk National University, Jeonju 561 – 756, South Korea
• Dr. Pratibha Jolly, Principal, Acharya Narendra Dev College, (University of Delhi), Govindpuri, Kalkaji, New Delhi, 110 019 INDIA
• Prof. A. Rahman Omar, Professor of Physics, Malaysia
• Prof. Fatima Hasnain, Associate Professor of Physics, Department of Physics, APWA Govt. College for Women, Karachchi, Pakistan
• Prof. Abd. Aziz Tajuddin, Professor & Dean, School of Physics, University Sains Malaysia, 11800 USM Penang Malaysia
• Prof. Fangling Peng, Professor of Physics, Physics Department, Beijing Normal University, Beijing, 100875, P.R. of China
• Mr. Ivan B. Culaba, Lecturer in Physics, Department of Physics, Loyola Schools, Ateneo de Manila University, Loyola Heights, Quezon City, Philippines 1101
• Mr. Joel Tiu Maquiling, Department of Physics, Loyola Schools, Ateneo de Manila University, Loyola Heights, Quezon City, Philippines 1101
• Prof. Akizo Kobayashi, Professor of Science Education, Department of Science Education, Faculty of Education & Human Science, Niigata University, 8050 Ikarashi Ni-no-cho, Niigata 950-2181, Japan
• Prof. Jin Seung Kim, Professor of Physics, Department of Physics, Chonbuk National University, Jeonju 561 – 756, South Korea
• Dr. Sikamtath Mitarary, Ministry of Education, Royal Kingdom of Laos
• Prof. Basil M. de Silva, Department of Mathematics & Statistics, RMIT University, Melbourne3001, Victoria, Australia
• Prof. Anders Kallner, Karolinska Institute, Stockholm, Sweden
• Prof. Mark W. Chase, Jodrell Laboratory, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3DS, UK
• Dr. Michael F. Fay, Jodrell Laboratory, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3DS, UK
• Dr. Rosabelle Samuel, Department of Higher Plant Systematics, Institute of Botany, University of Vienna, Rennwey – 14, A – 1030, Vienna, Austria
• Dr. A.R. Jayaweera, University of Virginia, Cardiac Imaging Center, P.O. Box 158, Charlottesville, Virginia 21208
• Dr. Mark Windale, Centre for Science Education, Sheffield Hallam University, City Campus, Howard Street, Sheffield, South Yorkshire 61 1WB, UK
• Stuart Davies, Harvard University, Center for Tropical Forest Science, 22, Divinity Avenue, Cambridge MA02138, USA
• Bandu Abeynarayana, 62, Todman Avenue, Kensington 2033, NSW Australia
• A. M. Deshmukh, Reader, Y. C. College of Science, Faculty of Science, Shivagi University, Kolhapur, Karad 415124, India
• Masaru Yoshida, Gondwana Institute for Geology and Environment, Hashimoto 648 – 0091, Japan

Workshops (WS), Training Programmes (TP), Short Courses (SC) and Research Sessions (RS) conducted from July 2002 to March 2003

Event	Co-ordinator/s (Board/s of Study)	Period	No. of Participants

July – December 2002			
Medicinal Plants (TP)	Dr. K.U. Tennakoon (Plant Sciences)	Aug. 10 - 11	38
PGIS Research Sessions (RS)	Prof. R.M.G. Rajapakse Dr. K.U. Tennakoon	Sep. 7 - 8	205
Analysis of Quantitative Trait Loci (QTL) (WS)	Prof. I.A.U.N. Gunatilleke (Plant Sciences)	Sep. 17 - 18	13
UNESCO - ASPEN Regional Workshop on Active Learning in Physics (WS)	Prof. M.A.K.L. Dissanayake (Science Education)	Nov. 30 – Dec. 4	57
January – March 2003			
Quality Assurance in Healthcare Laboratories (WS)	Dr. S.W. Gunasekera (Biochemistry & Molecular Biology)	Jan. 11 – 12	21
Industrial Raw Materials in Sri Lanka – Occurrence & Processing (SC)	Prof. N.S. Kumar & Dr. C.P. Udawatta (Chemical Sciences)	Feb. 14 – 16	25
"Hands on Science" for Junior Secondary Teachers (WS)	Dr. S. Karunaratne (Science Education)	Feb. 20 – 21	98
Rock Quarrying & Quarry Management (WS)	Dr.H.A.dharmagunawardhane (Earth Sciences)	Feb. 22 – 23	9

Coordinators' Reports

TRAINING PROGRAMME ON MEDICINAL PLANTS

A successful two-day training program on Medicinal Plants was conducted by the Board of Study in Plant Sciences in collaboration with the Department of Botany, University of Peradeniya from 10th –11th August 2002. The Sri Lanka Conservation and Sustainable Use of Medicinal Plants Project of the Ministry of Health, Nutrition and Welfare sponsored this training program. The objective of this workshop was to impart knowledge of the principles of identification, conservation, cultivation, diseases, handling of plant material and the pharmacognosy of medicinal plants to the participants. There were 38 participants including lecturers, medical officers and research officers from the Bandaranaike Memorial Ayurveda Research Institute (BMARI), National Institute of Traditional Medicine (NITM), Ministry of Health, Nutrition and Welfare, and the Sri Lanka Conservation and Sustainable Use of Medicinal Plants Project. Final year Botany (Hons.) students of the Department of Botany, University of Peradeniya too participated in this training program.

A field demonstration during the training programme at the medicinal plant nursery, Royal Botanic Gardens, Peradeniya.

The program consisted of lectures, laboratory work and filed visits covering a number of topics including Identification and Conservation of Medicinal Plants; Principles of Propagation and Cultivation of Medicinal Plants; Field Diseases and Processing of Plant Material; Chemical Extraction; Bio Active Screening and Pharmacology, and Technology Transfer Related to Medicinal Plants. The training program was conducted by experts from the Departments of Botany, Chemistry and Agriculture Extension of University of Peradeniya, National Botanic Gardens and the Department of Export Agriculture. The program provided latest scientific information and hands-on training to the participants in the field of "Medicinal Plants". All modules of the program received good ratings from the participants and most of them expressed the view that it would be beneficial to have a follow-up course and an M.Sc. program related to the field of medicinal plants in the future.

Coordinator: Dr. K. U. Tennakoon

WORKSHOP ON 'MAPPING OF QUANTITATIVE TRAIT LOCI (QTL) ASSOCIATED WITH DROUGHT RESISTANCE IN RICE'

The use of molecular mapping techniques such as the 'Quantitative Trait Loci analysis' in the improvement of genetically complex drought resistance traits in rice offer an opportunity to exploit resistance genes which are quantitative in nature and have therefore previously proved intractable to conventional breeding. The application of this molecular marker technology for rice appears to be a challenging task and promises to improve the speed of advancement by allowing for the identification of QTLs that contribute to drought resistance, thereby leading the way to strategic improvement of rice by marker-assisted breeding. Improving the drought resistance of rice varieties by introducing traits which contribute to drought avoidance or drought tolerance should have considerable potential for increasing rice production in drought-prone areas.
The workshop on 'Mapping of quantitative trait loci associated with drought resistance in rice' was conducted by Dr. Adam Price, Lecturer in Plant Molecular Genetics in the Department of Plant and Soil Science, University of Aberdeen, UK. His visit to Sri Lanka was sponsored by a Higher Education (HE) Link through the British Council, Sri Lanka, between the Department of Botany at University of Peradeniya and the Department of Plant and Soil Science (now the School of Biological Sciences) at University of Aberdeen. The workshop was jointly conducted by the Postgraduate Institute of Science and the Department of Agriculture over a two-day period from 16-17 September 2002 for those involved and/or interested in molecular plant breeding. A total of 13 participants from the University of Peradeniya (05), Department of Agriculture (05), Eastern University (01), Tea Research Institute (01) and Coconut Research Institute (01) participated in the workshop conducted using the computer facilities at the PGIS.

Prof. I. A. U. N. Gunatilleke, principal coordinator of the workshop addressing the inaugural session at the PGRC. Seated from left: Ms. Anna Searle, Deputy Director/ British Council, Mr. P. Periyasamy, Director-General/Agriculture, Prof. K. Dahanayake, Director/ PGIS, Dr. Adam Price & Dr. Muthukudaarachchi.

The principal co-ordinator of the workshop was Prof. I.A.U.N. Gunatilleke who was assisted by Dr. M. Muthukuda-arachchi of the Department of Agriculture, Prof. A.L.T. Perera, Faculty of Agriculture and Dr. P. Sarawanakumar of the Department of Botany at University of Peradeniya. A familiarisation visit for Dr. Price on Sri Lankan rice cultivation and breeding was arranged by the Department of Agriculture to their Rice Research and Development

Institute (RRDI) at Batalagoda, Field Crop Research Institute at Maha Illuppallama and Regional Agricultural Research Station at Aralaganwila before the commencement of the workshop. Dr. Muthukuda-arachchi of the Department of Agriculture facilitated the field programme and accommodation for Dr. Price. Dr. Price conducted a seminar at the RRDI, Batalagoda on 'QTL mapping of drought resistance and related traits in rice' for about 30 scientists drawn from the Department of Agriculture and the Universities of Peradeniya and Colombo.

The workshop dealt with i) the methods available for identification of genetic markers such as RFLP, AFLP and micro-satellites, ii) construction of a linkage map in rice using software MapMaker version 3.0, and iii) QTL analysis using composite interval mapping with the software QTL Cartographer version 1.15. The QTL approach was described using the results obtained by Dr. Price and his collaborators, especially those at IRRI (Philippines) and Centre for Arid Zone studies at the University of Wales, Bangor. In outline, the QTL analysis is as follows: a) choose a trait with value or potential value for breeding such as drought resistance, b) identify parental lines displaying extreme phenotypes for this trait, c) cross these lines to produce progenies which segregate for this trait of 70-300 plants or lines, d) phenotype the population for the trait, e) screen the parents of the population for genetic polymorphism using restriction fragment length polymorphism or PCR based markers, f) determine the genotype of all the progenies for the selected markers, g) construct a genetic map from marker data using computer programmes such as MapMaker, h) identify markers associated with the trait using analysis of variance or interval mapping techniques such as those employed by the program MapMaker/QTL, QTL Cartographer. Dr. Price explained each of the above steps with original research data from a cross between two rice varieties 'Bala' and 'Azucena' on which he and his collaborators have been working over seven years.

Dr. Price being briefed by RRDI scientists about their breeding programmes at experimental rice fields, Batalagoda.

The above mentioned computer software programmes brought by Dr. Price are installed at the PGIS computer facility and are available for a limited period for those who wish to use them or copy them for research use. Partial funding was received from the Ministry of Environment and Natural Resources. The Department of Agriculture provided traveling and accommodation facilities during the field visits and the workshop of Dr. Price. In return, the participants of the Department of Agriculture (05 in number) were accommodated at the workshop free-of-charge.

The response of the participants for the questionnaire revealed that those who were directly involved in the use of molecular markers in crop breeding highly appreciated the state-of-the-art techniques introduced in mapping of QTLs during this workshop which are useful in their own research work. As a follow up, formulation of a joint research programme in collaboration with the Department of Agriculture and the Universities of Peradeniya and Aberdeen was contemplated.

Prof. I. A. U. N. Gunatilleke,
Principal co-ordinator of the HE Link and workshop,
Department of Botany, University of Peradeniya

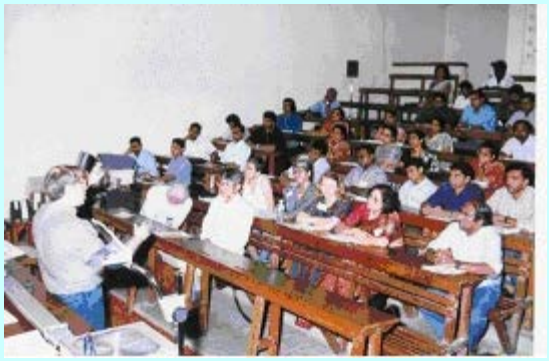
UNESCO-ASPEN REGIONAL WORKSHOP ON ACTIVE LEARNING IN PHYSICS

The 4th General Assembly (GA) of the ASPEN (Asian Physics Education Network) and a regional workshop on Active Learning in Physics, organized by the PGIS Board of Study in Science Education and the Department of Physics, University of Peradeniya were held from 29th November to 5th December 2002 at Peradeniya. The GA was held at the PGIS and the workshop was held at the Department of Physics. Both events were supported by UNESCO, the Ministry of Economic Reform, Science & Technology (ADB Project) and the PGIS.

Prof. Lakshman Dissanayake, newly elected Chairman of the ASPEN, lighting the Traditional Oil Lamp at the Inaugural Session of the UNESCO - ASPEN Regional Workshop on 'Active Learning in Physics'.

At the ASPEN General Assembly, Prof. Lakshman Dissanayake, Chairman of the PGIS Board of Study in Science Education and the National Point of Contact for Sri Lanka at ASPEN was elected unanimously as the new Chairman of the ASPEN for the next five-year period. Dr. Alex Mazzolini (NPC, Australia) was elected as the Executive Secretary and Prof. Abd. Aziz Tajuddin (NPC, Malaysia) as the Vice Chairman.

Resource persons from USA, France, South Africa, India, Sri Lanka and other Asian countries conducted the 3-day workshop. 17 foreign participants representing India, Pakistan, Sri Lanka, Malaysia, Thailand, S. Korea, Philippines, Japan and China, 27 local participants from universities and 13 GCE A.L. Physics teachers from Sri Lankan schools attended the workshop. The aim of the workshop was to train Physics lecturers and senior school teachers in interactive methods on teaching Physics using computer-based as well as computer-independent techniques. Such interactive learning methods, where the student participates actively in the teaching/learning process, are becoming increasingly popular and much more effective compared to the traditional methods of teaching Physics and are being widely used in many developed countries at present. The workshop sessions consisting of Interactive Lecture Demonstrations (ILDs) and hands-on laboratory activities were conducted by eminent Physics Educationists like Prof. David Sokoloff (USA), Prof. Richard Hake (USA), Prof. Diane Grayson (S. Africa), Prof. Pratibha Jolly (India) and Prof. Rahman Omar (Malaysia). Dr. Minella Alarcon represented UNESCO, Paris at the GA and the workshop.



Participants of the workshop attending a session conducted by Prof. David Sokoloff of U.S.A.

The workshop was organized by a committee chaired by Prof. M.A.K. Lakshman Dissanayake and was inaugurated by Prof. Kapila Gunasekera, Vice-Chancellor, University of Peradeniya on December 2nd at the PGIS Auditorium. Prof. Kapila Dahanayake, Director of the PGIS gave the welcome speech. Prof. S.A. Kulasooriya, Dean, Faculty of Science

and Prof. B.S.B. Karunaratne, Head, Department of Physics, University of Peradeniya also addressed the participants at the inauguration ceremony.

Prof. M. A. K. Lakshman Dissanayake
Chairman, Organizing Committee &
Chairman, Asian Physics Education Network (ASPEN)

WORKSHOP ON QUALITY CONTROL - QUALITY ASSURANCE TO HEALTH SECTOR LABORATORY PERSONNEL

Quality Assurance in Laboratory Medicine was the topic of the first PGIS workshop conducted in 2003 (January 11th and 12th). This workshop on Health Laboratory Quality Assurance was the first of its kind yet to be held in Sri Lanka. The workshop was attended by the State Sector Health Laboratory Personnel, Tutors of the Medical Laboratory Technologist Training Schools and Private Sector Health Laboratory Personnel.

Group photograph of resource persons and participants of the workshop on Quality Assurance in Healthcare Laboratories. Resource persons (seated from left to right): Dr. S.R. Wijerathna, Dr. D.M. Dissanayake, Prof. Anders Kallner (Karolinska Hospital, Stockholm, Sweden), Prof. P.A.J. Perera (Chairman, Board of Study in Biochemistry Molecular Biology), Dr. S.W. Gunasekera (Workshop Coordinator), Dr. S. Ranasinghe and Dr. K. Kaluarachchi.

The workshop received support from the Department of Health Services, Medical Research Institute and Word Health Organization. The Postgraduate Institute of Science expresses its gratitude to Dr. Amal Silva, Director Private Health Sector Development, Dr. Gaya Kolombage, Director, Medical Research Institute and Dr. Palitha Abeykoon of the World Health Organization for their valuable contributions towards the workshop.

The workshop had the following unique features: (a) addressing a quality issue in healthcare delivery (b) establishing links with the Department of Health Services on private health sector development (c) strengthening links with the World Health Organization (d) establishing links with the Karolynska Institute, Stockholm, Sweden and (e) bringing the health laboratory technologists of the state and private sectors together to address an issue faced by both sectors.

The participants, with firsthand experience, documented the deficiencies that exist in the present Quality Assurance programme of Sri Lanka. They made proposals for an improved Quality Assurance programme in Sri Lanka.

This workshop on Health Laboratory Quality Assurance paved the way to a follow-up activity, a pilot study with both the state sector and private sector participation to determine the feasibility of adoption of a simpler and less expensive Quality Assurance method suitable to Sri Lanka.

Coordinator: Dr. S. W. Gunasekera

SHORT COURSE ON INDUSTRIAL RAW MATERIALS IN SRI LANKA –

OCCURRENCE & PROCESSING

A Short Course on "Industrial Raw Materials: Occurrence and Processing" was held at the Postgraduate Institute of Science, University of Peradeniya, during February 14 – 16, 2003. The programme was partly sponsored by the S & T Personnel Development project of the Ministry of Economic Reform, Science and Technology. The program was inaugurated by His Excellency, A Malhotra, Deputy High Commissioner for India. Prof. K G A Goonesekara, Vice Chancellor, University of Peradeniya, Prof. K Dahanayake, Director, PGIS, and Prof. S A Kulasooriya, Dean, Faculty of Science, also graced the occasion. There were 25 participants drawn from the National Universities, Industry and the private sector. Resource persons, recognized for their expertise in the field, conducted the programme. They included Professors O A Ileperuma, K Dahanayake, D T B Tennakoon, B S B Karunaratne, R P Gunawardane and Drs. H M T G A Pitawala, R Fernando, P W S K Bandaranayake and A Senaratne (University of Peradeniya), Mr. S A Nandadeva (Mineral Sands Corporation), Mr. N W B Balasooriya (South Eastern University), Mr. S M S Abeyaweera (National Gem and Jewellery Institute), Mr. A Sirimanna (Royal Ceramics) and Mr. K Abaygoonaratne (Holcim Lanka Ltd.). The programme commenced with a presentation by Prof. O A Ileperuma on "An Overview – Mineral resources for economic prosperity".

Participants and resource persons of the Short Course on Industrial Raw Materials in Sri Lanka. Seated from left to right: Dr. C. P. Udawatta, Dr. A. Senarathne, Prof. K. Dahanayake (Director, PGIS), His Excellency A. Malhotra (Deputy High Commissioner of India), Prof. K. G. A. Gunasekara (Vice-Chancellor, University of Peradeniya), Prof. N. S. Kumar (Chairperson, Board of Study in Chemical Sciences) and Mr. S. A. Nandadeva.

Sri Lanka has some of the best quality mineral deposits in the world. The occurrence of raw materials, the quality of deposits, their processing, the need to carry out research to ensure that high quality value added products are made locally for use in local industry and for international markets were some of the topics discussed during the program. Possibilities for making useful products by the application of both new and established chemical processes were also highlighted. Drs. C P U Udawatte and H M T G A Pitawala accompanied the participants on a field trip to a mica processing plant, a feldspar plant, a marble mine at Matale and a quartz quarry in Galaha. Feed back from the participants was very positive and ideas were exchanged regarding future programs of interest to Industry and the Private Sector.

Coordinators: Prof. N. S. Kumar & Dr. C. P. Udawatta

WORKSHOP ON "HANDS-ON SCIENCE"

With the introduction of education reforms in 1997 it is expected to develop a "total child" with knowledge, skills, attitudes and values. So far anticipated objectives have not been achieved mainly due to the lack of competence in teachers. A workshop on "Hands-on" science for junior secondary science teachers was organized by the Board of Study in Science Education of the PGIS with the sponsorship of the British Council to help develop skills in science teaching. Dr. Mark Windale from Sheffield Hallam University, U.K. conducted this workshop as an activity of the Higher Education Link programme between the PGIS and Sheffield Hallam University. It was also an awareness workshop on Active Teaching and Learning Approaches in Science (ATLAS). Dr. Windale has extensive experience

in conducting ATLAS workshops in Thailand and Malaysia. He introduced many novel activities at which teachers participated very actively. There were science-related activities on active reading, active listening and active doing. Teachers made posters on current topics, and were involved in computer and non-computer simulation activities.

Prof. K. Dahanayake, Director of the PGIS addressing the inaugural session of the workshop. Seated from left: Dr. S. Karunaratne, Mrs. C. Atapattu, Prof. S. A. Kulasooriya, (Dean, Faculty of Science), Prof. K.G.A. Goonasekera (Vice Chancellor, University of Peradeniya), Dr. M. Windale & Prof. M.A.K.L. Dissanayake

Teachers were given an opportunity to play games to understand the electric flow. All of them had evaluated the workshop activities with very positive comments. It was revealed by teachers that the activities they did in the workshop made them realize some of their weaknesses. M.Sc. students in science education also participated in the workshop. Junior secondary teachers who participated in the workshop were from the central province. Altogether there were 98 participants. Mrs. Chandra Atapattu, Acting Director, Science, Central Provincial Ministry of Education stressed on the importance of hands-on science activities in capacity building of teachers.

Dr. Mark Windale demonstrating "Hands -on Science' to workshop participants.

Coordinator: Dr. S. Karunaratne

WORKSHOP ON ROCK QUARRYING & QUARRY MANAGEMENT

A Two-day workshop on Rock Quarrying and Management was organized by the PGIS Board of Study in Earth sciences and was held at the PGIS from 22nd to 23rd February 2003. The workshop was conducted for Rock quarry owners and managers of the Kandy district. Nine participants were present at the workshop. The workshop was inaugurated by the Director PGIS in association with the Dean of the Faculty of Science and the Director Geological Survey and Mines Bureau.

The objective of the workshop was to enlighten the participants about efficient and safe quarry management, explosive handling, environmental and legal aspects of rock quarrying. Lectures were conduced by experienced lecturers of the Peradeniya university in the fields of Rock Quarrying and Quarry Management, Geology and Civil Engineering.

Themes of presentations of the workshop were: Geology and Rocks of Sri Lanka, Properties of Rocks and Selection of Rocks for Construction Industry, Quarrying Methods, Quarry Management, Blasting and Handling of Explosives, Safety, Quality Control, Environmental and Legal Aspects, On the second day of the workshop a field excursion was organized to visit some selected quarry sites in the Kandy area.

All participants evaluated the workshop as very useful and requested to follow up with more workshops in the future.

Coordinator: Dr. H.A. Dharmagunawardhane

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Year of Sapphire, 2003

Say it with a sapphire

Sapphire : In the corundum species of minerals, all but deep red stones (Ruby), are called Sapphires with a prefix for colours.
Sapphires come from all the colours of the rainbow (visible spectrum of light) and Sri Lanka is the host for most of these coloured Sapphires (cover).
Sri Lanka is the leading Sapphire producer in the world.
Japan Jewellery Association has declared 2003 as **"the year of Sapphire"** for its promotions.

National Gem and Jewellery Authority,
No.25, Galle Face Terrace,
Colombo 03, Sri Lanka.

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Fax: 329697
Email: ngja@sltnet.lk