Postgraduate Institute of Medicine
University of Colombo
Sri Lanka
Contents

Message from the Director, Postgraduate Institute of Medicine 4
Message from the Chairperson, Specialty Board in Biomedical Informatics 5
Batch Photo 6
Specialty Board in Biomedical Informatics 8
Dissertations and Projects
  Public Health Informatics 15
  Medical Education Informatics 33
  Bioinformatics 39
Sri Lanka Journal of Biomedical Informatics 52
Photo Gallery 53
Acknowledgements 59
I am proud to be associated with this new course offered by the Postgraduate Institute of Medicine (PGIM), University of Colombo. For the first time in Sri Lanka, the PGIM is training skilled professionals in the field through our Masters degree programme in Biomedical Informatics. With the new trainees entering the county’s health sector it is bound to progress rapidly in the immediate future.

I am happy to see the first batch of graduates successfully completing their training programme and reporting to the Ministry of Health to engage in health informatics activities. This will symbolize coming age of the field of health informatics, which is relatively new to our country. As the Director of the PGIM I wish them success in their future eHealth activities.

In addition to Ministry of Health I foresee a future for such education in the Public Heath Sector, Genetic and Molecular Sciences and in Medical and Allied Health Sciences education in the state and non state sectors.

I am grateful to Prof. Sandeep Sahay and Prof. Vajira H. W. Dissanayke who played their roles to direct the funding to PGIM which made us look at this collaboration as a useful and doable project at a time when the country was in a pitiable state engulfed in terrorism.

Vidyajyothi Professor Rezvi Sheriff MD, FRCP, FRACP, FCCP, FNASSL
Director
Postgraduate Institute of Medicine
University of Colombo
Sri Lanka
Message from the Chairperson, Specialty Board in Biomedical Informatics

The MSc in Biomedical Informatics at the Postgraduate Institute of Medicine (PGIM) grew out of a simple email from Prof. Sundeep Sahay, Professor, Department of Informatics, University of Oslo to me in April 2007. In that email he said that “We are quite keen to establish a partnership with a University in Sri Lanka.....for the establishment of a masters program in health informatics”. I consulted Prof. Rezvi Sheriff, the Director of the PGIM, who gave his approval. This lead to a visit by Prof. Sahay to Colombo in June 2007 and with the support and guidance of Prof. Sheriff, who was also the President of the Health Informatics Society of Sri Lanka at that time, plans were drawn up. Simultaneously Prof. Sahay and I worked on applying for a grant to support the course. We were successful in securing a NOMA grant awarded by Norad and managed by the Norwegian Centre for International Cooperation in Higher Education. This was how the NOMA project came into being at the PGIM. This funding made it possible for the students and staff in the course to ‘operate’ at international level affording them opportunities to travel to conferences and workshops abroad and making it possible to organise international workshops and conferences locally.

Although the first batch of students were selected in December 2008, it was not until May 2009, that it was possible to obtain their release from the Ministry of Health to begin the course. Since then the course has progressed smoothly. Two more batches have entered the training programme. Applications to join the course have come from Sri Lanka and abroad. There is an inquiry from a leading Indian University to franchise the course and conduct it in India from 2012. The MSc in Biomedical Informatics course is the only course in the PGIM that conducts its selection examinations abroad. At the moment one student from Vietnam is following the course in the second batch.

Sri Lanka’s health sector is already reaping the benefits of training these graduates. This publication illustrates the contribution they have made both academically as well as in terms of designing, developing and implementing systems for the health sector in Sri Lanka. The depth and breadth of expertise demonstrated by them in health policy, public health informatics, medical education informatics, and bioinformatics is truly amazing. It speaks volumes for the expertise that we have been able to develop in this country in a very short period of time. Sri Lanka’s health sector stands to benefit from their expertise. The era of eHealth has truly dawned in Sri Lanka.

Prof. Vajira H. W. Dissanayake MBBS (Colombo), PhD (Nottingham)  
Chairperson, Specialty Board in Biomedical Informatics  
Postgraduate Institute of Medicine  
University of Colombo
First row from left
Dr. Pandula Siribaddana, Dr. Roshan Hewapathirana, Dr. B.J.C.Perera, Professor Jayantha Weerasinghe,
Professor Rezvi Sheriff, Professor Vajira H. W. Dissanayake, Dr. Shiromi Arunatileka, Dr. S R U Wimalaratne,
Mr Pubudu S. Samarakoon

Second row from left
Vajira S. Weerasekara, R. Anaclitus Culas, Sonali A. Lunuwila

Third row from left
T.R.D.A.Gunasekara, Deepaka S. Thubellage, M. P. N. S. Cooray, K. Thavayogarajah, Buddhika Dayarathne, P.H.C.Kumanayake,
Kusal Wijayaweera, Rikaz Sheriff, Nadish C. Kariyawasam, Saminda M. Dharmaratne, H.M.N.B. Abeysinghe,
Udara P.V.A. Ariyasinghe, Muditha M. Hapudeniya

Fourth row from left
A M A Jayatilake, Clive C. James, K K Pradeep Sylva, Ravi R. Wickramaratne, S.M.K.W.K.Seneviratne, M Subodha Manoj,
Sunith D. Kumarapperuma, Arjuna Wijekoon, L.B.B.Liyange, W.F.D. Ananda Fonseka

Absentees
Specialty Board in Biomedical Informatics

Prof. Vajira H W Dissanayake MBBS, PhD (Nottingham)

- Professor, Department of Anatomy, Faculty of Medicine, University of Colombo
- Medical Geneticist, Human Genetics Unit, Faculty of Medicine, University of Colombo
- Chairperson, Specialty Board in Biomedical Informatics, PGIM
- Joint Executive Editor, Sri Lanka Journal of Biomedical Informatics
- President, Health Informatics Society of Sri Lanka
- President Elect, Sri Lanka Medical Association
- Member, eHealth Steering Committee, Ministry of Health

---

Dr. Shiromi Arunatileka BSc (Hons), MBA, PhD (UWS)

- Senior Lecturer, University of Colombo School of Computing
- Member, Specialty Board in Biomedical Informatics
Dr. Roshan Hewapathirana  MBBS (Colombo), MSc in IT (Moratuwa), SCMAD, MIEEE

- Member, Specialty Board in Biomedical Informatics
- Project Manager, MSc Biomedical Informatics Course
- Research Fellow, Institute of Informatics, University of Oslo, Norway
- Joint Executive Editor, Sri Lanka Journal of Biomedical Informatics

Dr. Rohana Basil Marasinghe  MBBS, PhD (Brisbane)

- Senior Lecturer in Medical Education, Faculty of Medicine and Health Sciences, University of Sri Jayewardenepura
- Member, Specialty Board in Biomedical Informatics
Dr. B.J.C. Perera  MBBS (Ceylon), FRCP (Edinburgh), DCH (Ceylon), FRCP (London), DCH (England), FRCPCH (UK), MRCP (U.K.), FSLCPaed, MD (Paediatrics) Sri Lanka, FCCP, Honorary FRCPCH(UK), Honorary FCGP(SL)

- Consultant Paediatrician
- Member, Specialty Board in Biomedical Informatics
- Member, Board of Study in Paediatrics
- Editor in Chief, Sri Lanka Journal of Bio-Medical Informatics
- Joint Editor, Sri Lanka Journal of Child Health

Pubudu Samarakoon  BSc, MSc (Bioinformatics)

- Member, Specialty Board in Biomedical Informatics
- Tutor, MSc Biomedical Informatics Course
- Research Fellow, Faculty of Medicine, University of Oslo, Norway
Dr. Chitramalee De Silva. MBBS, MSc, MD

- Deputy Director, Family Health Bureau, Ministry of Health
- Member, Specialty Board in Biomedical Informatics
- President, Perinatal Society of Sri Lanka

Dr. Pandula Siribaddana MBBS (Colombo), PG. Dip. Med Ed (Colombo)

- Pro-tem Secretary, Specialty Board in Biomedical Informatics
- Lecturer, Postgraduate Institute of Medicine, University of Colombo
Prof. Sundeep Sahay  MMS,ME (Industrial Development), PhD (Information System), MA (Philosophy), MPH

- Professor, Department of Informatics, University of Oslo, Norway
- External Advisor, Specialty Board in Biomedical Informatics, PGIM
- Honorary President, HISP India

Prof. Jayantha Weerasinghe  BDS, MS (Colombo), PhD (Japan)

- Professor in Oral & Maxillofacial Surgery & Consultant OMF Surgeon, Faculty of Dental Sciences, University of Peradeniya
- Visiting Professor, Postgraduate Institute of Medicine
- Member, Specialty Board in Biomedical Informatics
- Immediate Past Chairman, Board of Study in Dental Surgery
Dr. S.R.U. Wimalarathne BDS, MSc, MD

- Director (Health Information), Ministry of Health
- Member, Specialty Board in Biomedical Informatics
- Member, National eHealth Steering Committee

Dr. Rasika Rampatige MBBS, MD(ComMed)

- Consultant Community Physician
- Member, Specialty Board in Biomedical Informatics (2008 to 2009)
Ms Harshya Lasangi Senaratne

- Project Secretary, NOMA Project
Public Health Informatics
Recommendations for Streamlining eHealth Activities in Sri Lanka

By - eHealth Roadmap Development Committee

Many healthcare systems around the globe are adopting information technology into health information systems. In most countries this happens without a proper mechanism for streamlining and co-ordination. This is true for Sri Lanka as well leading to issues of interoperability, privacy of clients/patients and sustainability of information systems. To overcome these problems the Ministry of Health appointed a National eHealth Steering Committee (NeHSC). The eHealth Roadmap Development (eHRDC) committee was set up as a technical committee to develop the draft National eHealth Base Documents in consultation with the NeHSC.

A. National eHealth Base Documents

NeHSC which is the apex committee on eHealth activities in Sri Lanka decided to develop a national policy and detailed standards and guidelines on eHealth. To plan, implement, and evaluate these a strategic plan was needed. The eHRD was vested with the responsibility of coming up with draft versions of the National eHealth Base Documents intended for planning and streamlining the eHealth activities of the country.

Following are the three National eHealth Base Documents developed by eHRD.

A. National eHealth Policy (NeH-Policy)
B. National eHealth Standards & Guidelines (NeH-Standards & Guidelines)
C. National eHealth Strategic Plan (NeH-Strategic Plan)
B. **Building Capacity for Planning and Streamlining eHealth Activities**

It is recommended that the Health Information Unit of the Ministry of Health be the focal point for all eHealth activities in Sri Lanka. This Unit could function as the central coordinating and driving point for eHealth activities in the Ministry of Health/Department of Health Services. This is not a task however, that can be undertaken by the Health Information Unit alone. This gives rise to the need for an expanded structure representing all key state sectors healthcare institutions and administrative units.

![Overview of the proposed structure for Building Capacity for Planning and Streamlining eHealth Activities](attachment:image)

C. **An Architectural Model for the National Health Information System**

Several health institutions have already begun using IT solutions. However due to the absence of a national health information system architecture those systems lack the overall information integrity, central co-ordination and information interoperability. Therefore the need for a high level electronic health information system architecture was identified to overcome the above mentioned problems and also to cater to the increasing demand for electronically accessible services in the health domain.

Using principles of enterprise architecture the existing health information system was analyzed with regards to the organizational, administrative, and functional structures taking in to consideration the perceptions of stakeholders and their needs. The architectural models of health information systems in different countries were also analyzed and a common set of features were identified.

An architectural model for the national health information system was derived in the context of the Sri Lankan health domain to achieve an efficient, interoperable, secure, reliable, accessible and maintainable health information system.

The proposed national electronic health information system architecture is composed of the eHealth system, stakeholders and the communication network. The identified services in the health domain are expected to be provided by one or more sub-systems. The national eHealth
system will be composed of the above mentioned sub-systems, which will be implemented according to a service oriented architecture.

D. Computer Network Architecture for the State Health Sector of Sri Lanka

A network architecture is prescribed comprising of physical networks based on client/ server architecture implemented using the TCP/IP protocol suit and standard Ethernet technologies. A reliable, dependable, secure, and safe Wide Area Network (WAN) called the State Health Network (SHN) is to be established through a Virtual Private Network (VPN). All institutes under the Ministry of Health and all provincial departments of health shall connect to this SHN through a firewall.

All devices within an institution shall be connected to a Private Local Area Network (P-LAN). Further to this, it is recommended to follow the latest versions on networking (including mobile devices) and cabling standards of EIA (Electronic Industries Alliance), TIA (Telecommunications Industry Association), IEEE (Institute of Electrical and Electronics Engineers) and ISO (International Organization for Standardization).

E. Privacy, Confidentiality and Information Security for eHealth

eHealth has human rights, ethical and legal aspects. Among them privacy, confidentiality and information security are some of the key areas that should be addressed in the eHealth policy.

The aim of this part of the work was to provide recommendations to address privacy, confidentiality and security aspects in eHealth solutions.

Importance of formulating legislation specific to privacy and confidentiality of health information is stressed and privacy and confidentiality guidelines based on fair information practices are recommended. Relevance, integrity, access to personal information, need for informed consent when information is being used for secondary purposes and when disclosing to third parties is addressed in the recommendations.

Information security guidelines and standards are recommended. Information security guidelines and standards which address asset management, human recourses security infrastructure, physical and environment security and role based access control are recommended. Application of these recommendations should prevent loss, damage, corruption, interception, unauthorized access and misappropriation or misuse of individual’s (patient, client, health worker) information.

F. Electronic Data Standards for the Health Sector

Due to domain specific and system specific factors individual systems should interchange information between them to facilitate integrated care pathways. Even though many of these systems manage information well within the system, they lack the ability to share information with other systems.
Although it is relatively easy to connect systems physically, it is difficult to achieve seamless data exchange between individual systems due to the lack of system interoperability, a clinical vocabulary and a unique healthcare identifier system. This has prompted many healthcare authorities and international standardization authorities to set data standards, in order to achieve interoperability.

Health Level 7 (HL7) version 3.0 is recommended as the standard for clinical data exchange between systems. Systemized Nomenclature of Medicine (SNOMED) – Clinical Terms with cross mapping to International Classification of Disease (ICD) revision 10 is recommended as the clinical vocabulary standard. These recommendations were made taking into consideration facts like availability, adoptability, acceptance by the International Organization for Standardization (ISO), vendor acceptance, platform independence and popularity.

G. Health Identifier Number

A 14 digit healthcare identifier number is recommended where the first three digits will indicate the institution, the next four digits will indicate the year, the next three digits will indicate the day of the year and finally the last four digits are the serial number. This is proposed taking into account patient privacy/confidentiality, scope of implementation and the possibility to use a common citizen identifier number.

H. Computer Hardware and Electro-medical Equipment Standards

In incorporating ICT into the health sector of Sri Lanka, it is essential to provide a stable hardware infrastructure. This needs guidelines on interoperability, dependability, lifecycle management and power and environment saving. Studying international guidelines and considering their applicability to Sri Lanka is needed in developing these guidelines.

It is recommended that a Technical Evaluation Committee (TEC), dealing with equipment life cycle management, with hardware specialists be set up. Environment friendly recycling and eWaste management is advocated.

I. Web Standards and Information Provision

As ICT is used in government institutions to provide services, it is inevitable that they will step into the World Wide Web for service delivery. The impact web based health service/information delivery has had on the general public has been felt across the world. Therefore, a mechanism to regularize such web sites is vital. The policies and guidelines formulated for this purpose have been incorporated into the National eHealth Base Documents.

A Health Information Portal is proposed to provide health information and selected services through the Internet. Private sector health service providers can be authorized to access shared eHealth services through the Health Information Portal.
J. Human Resource Development Strategy for Digitalizing the State Health Sector

The Human Resources Planning and eHealth Policy Framework was identified as a priority by the Ministry of Health in January 2009.

Proposals are made on recruitment, job description, retention, training, carrier development in relation to eHealth, to take care of the adequacy, effectiveness and completeness of the eHealth human resources Development Strategy.

It is recommended that ICT staff to the state healthcare sector be appointed from the Sri Lanka ICT Service. Sri Lanka has taken a major step forward in eHealth by establishing specialized training on health informatics for medical professionals by starting the MSc in Biomedical Informatics course at the PGIM.

It is recommended to establish an eHealth Resource Centre at national level under the Health Information Unit of the Ministry of Health. This could be utilized as a centre for training of trainers (TOT) from the entire country facilitating continuous professional development.

Supervisors:
Dr. Gamini Wijayarathna
B.Sc. Hons (Kelaniya)
M.Eng.(UEC,Tokyo), Dr.Eng.(UEC,Tokyo)
Senior Lecturer in Information Technology
Department of Industrial Management
Faculty of Science
University of Kelaniya

Dr Roshan Hewapathirana
MBBS(Colombo), MSc in IT(Moratuwa), SCMAD, MIEEE
Member, Specialty Board in Biomedical Informatics
Health Facility Information Management System

Health care institutions comprise of a wide range of services and functional units which take part in patient care. These include diagnostic and treatment services and functions such as clinics, emergency rooms, laboratories, imaging, and theatres; hospitality functions such as food service and housekeeping; and the fundamental inpatient care or bed-related functions. When one consider all these functional units all of them have furniture, equipment and instruments that form the Health Care Facility. Managing these is vital for effective management of the health care system.

Maintaining details of this wide-ranging and constantly evolving facilities of a hospital, including patient care and non patient care facilities, require a large number of staff with specialized knowledge and expertise in preparing inventories which directly affect the health institution’s economic condition. Information on health facility distribution in the country, facility availability and status of the facility is important in evaluation of health facilities. The current manual system is not able to cater to this information need of the health administrators.

The web-based online Health Facility Information Management System has been developed taking into account all the inherent problems of the current system to cover all government hospitals in Sri Lanka.

In this system the hospital or health care institution administrators would have instant access to all the facilities in his/her institution, regional and provincial health administrators would have instant access to all the facilities in their region or province, and the central level administrators in the Ministry of Health would have instant access to information throughout the country. It is expected that with the implementation of this system facilities management in government health care institutions would improve contributing to the socio-economic development of the country.

Dr. K.A.S.D. Kumarapperuma
sunithdumidu@yahoo.com

Supervisor:
Prof. Jayantha Weerasinghe
BDS, MS (Colombo), PhD (Japan)
Member, Specialty Board in Biomedical Informatics
**Immunization Information System**

The immunization program in Sri Lanka is one of the most successful public health programs implemented by the Ministry of Health. Currently the Sri Lankan immunization information system is a fully paper based one with data gathered at Medical Officer of Health (MOH) level. Public Health Midwives (PHMs) have to fill lots of forms and returns in the current system. Data in this paper based system cannot be used for decision making in a timely manner. The strengths of this system however are, having a team of trained staff, and the well developed infrastructure. In recent years the private sector contribution to immunization coverage has seen an increase. But private sector data is not included in national statistics.

The objective of this work was to provide inputs to an ongoing project to develop web-based online immunization information system in the Epidemiology Unit by designing a systems requirement specification in partnership with the development team, implementation of the system and testing the system.

After implementation of this system it is envisaged that the efficiency of the immunization programme can be improved. This system will reduce the work load of the health care workers at all levels. Since this is a centralized system, health authorities can log into the system and generate reports at the touch of a button. As data will be entered into the system at the point of vaccination, up to date data will be available in the system. This will enable the administrators to get a snap shot view of immunization coverage across the country and take steps to improve vaccination coverage in areas that are lagging behind. The system will also generate reminder SMSs to parents three days prior to the vaccination date which will help to improve vaccination coverage. With the introduction of this system Sri Lanka will be able to save money by reducing vaccine wastage and saving man hours.

**Dr. L.B.B. Liyanage**
lasanthaliyanage@ymail.com

**Supervisors:**
Prof. Jayantha Weerasinghe  
BDS, MS (Colombo), PhD (Japan)  
Member, Specialty Board in Biomedical Informatics

Dr. Sudath Peiris  
Epidemiologist  
Epidemiology Unit  
Ministry of Healthcare and Nutrition
Human Resource Management Information System

Employees of an organization are its most valuable asset and managing them is a challenge for a large organization like the Ministry of Health that spans the entire country. Human resource management (HRM) is so important that organizations all over the world focus on it as a priority. Healthcare delivery systems are no exception.

In Sri Lanka, healthcare delivery is dominated by the government controlled public hospitals and other healthcare institutions. They are controlled and managed by the Ministry of Health. Doctors play the central role in delivering healthcare services and HRM of doctors requires attention. The current system of HRM of doctors in the Ministry of Health is an age-old paper-based manual system. The existing system is inherently slow and lack efficiency. Delays in document transfer from place to place, labour intense document tracing, loss of documents and data redundancy, waste of time and resources are all inherent pitfalls of the system. Digitalizing this manual system will definitely benefit the Ministry and the country in the long term.

The objective of this work was to find a solution to digitalize the process of HRM of all Doctors of the Ministry of Health. Initially, the requirements of the system were identified to develop a suitable software system. A comprehensive technical, economical and operational feasibility studies were undertaken. The main challenge thereafter was to design a system without altering the workflow of the current system.

iHRIS Manage 3.1.3 (Part of iHRIS suite, a fee and open source software, recommended by the World Health Organisation) was identified as suitable for customization as this was exclusively developed for the use in healthcare. The system could be implemented using the existing hardware and software infrastructure of the Ministry and other institutions and can be implemented in a web-based online mode. This ensures low initial cost while having flexibility for future development. This will require a dedicated central server machine. Stand-alone iHRIS Manage 3.1.3 was proposed as an alternative solution if problems occur with Intranet, Internet connectivity or servers. iHRIS manager did not have facilities for adding leave details and facilities for transfer management. These have been built into the system by me.

The system has been piloted successfully and can now be implemented.

Dr. I.M. Mujeeb
immujeeb73@gmail.com

Supervisor:
Dr. S.R.U.Wimalarathne
BDS, MSc, MD
Member, Specialty Board in Biomedical Informatics
Human Resource Information System for Nurses

Human Resources play a vital role in health care and act as the backbone of the health care setup. In the current setup almost all the data and information related to training, employment, deployment and cadre redistribution are maintained manually in a paper based format. Introduction and implementation of a brand new Human Resource Information System to the department of health would be a turning point in the path which leads Sri Lanka towards an ‘Information Communication and Technology’ era.

Initially in-depth analysis of the current Human Resource Management System for nurses was carried out and its issues were clearly identified. A comprehensive feasibility study was conducted on economical, technical, organizational and legal aspects. A Software Requirements Specification was then generated as a guideline for the proposed system development. Taking into consideration different software solutions available globally and methods of tailoring them according to our requirements, “iHRIS Manager” was chosen as the core software for the customisation of the proposed system. Mechanisms for data uploading and creating backups were also integrated into the system. The fully fledged end product was then tested according to universal pretesting standards before the implementation.

Implementation of this customised Human Resource Information System would be the first step of digitalization of Human Resources in Information of nurses in the Sri Lankan health care system.

Dr. Ravi R. Wickramaratne
raviwick@hotmail.com

Supervisor:
Dr. S. R. U. Wimalarathna
BDS, MSc, MD
Member, Specialty Board in Biomedical Informatics
School Health Management Information System

The health of a child is vital for effective learning. The health of a child directly contribute to the outcome of the education that he/she receives. School health services are an important component of the primary health care system of every country. Health habits learnt in school influence the peers, family and the local community.

According to the Family Health Bureau of Sri Lanka there are about 3.9 million school children in 9136 schools in the country with 47 percent of schools having less than 200 children. The existing school health information system is a paper base system. Being a paper-based information system it has some inherent problems which include poor quality of data, timeliness of data, completeness of data in data processing, accuracy of data and feedback. To overcome defects in the paper base system, there should be a web-based online school health management information system for the Family Health Bureau. DHIS2 is a Free and Open Source Software and it has been used in more than 15 countries around the world. DHIS2 has been developed based on the World Health Organization’s health data exchange format called Statistical Data and Metadata Exchange. So it was used to develop the school health management information system with no cost.

A school health management information system will ensure timely availability of information that is need for policy formulation and monitoring of school health programs at every level of supervision.

Implementation of this system is planned after piloting it in a selected Medical Officer of Health (MOH) area.

Dr. T.R.D.A Gunasekara
agtilinagunasekara150@gmail.com

Supervisor:
Dr. Chitramalee De Silva
Member, Specialty Board in Biomedical Informatics
Logistic Management Information System

Provision of basic health care is one of the primary responsibilities of the government with Maternal and Child Health constituting an important component of the health care system. Sri Lanka has achieved many successes in the field of Maternal and Child Health during the past few decades.

The current Logistic Management Information System (LMIS) for the Maternal and Child Health services in Sri Lanka is mainly paper-based and proves to be labor intensive. As a result, paper based data often not helpful for central management decision making because they are incomplete, inaccurate and untimely. There is a need for introducing a web based logistic management system in order to improve the efficiency and effectiveness of the current LMIS.

There are very few generalized LMIS software available in the market and they are not freely available. This project focused on the Free and Open Source Systems. District Health Information System (DHIS) is free and open source software system recommended by the World Health Organization. DHIS modular architecture is of great advantage as it enables customization. Therefore, the proposed system was developed by DHIS2 software.

This system can now be implemented. When implemented it brings in the potential benefits of minimizing the paper based components, streamlining the process and increasing communication between various levels of the supply chain, and improving the management of the entire operation.

Dr. Rajaluckshmy Anaclitus Culas

rajiculas@yahoo.com

Supervisor:

Dr. Mrs. Chithramalee de Silva
MBBS, MSc, MD
Member, Specialty Board in Biomedical Informatics
The Electronic Indoor Morbidity Mortality Report: A realistic approach to discharge data management

The Indoor Morbidity and Mortality Record (IMMR) is one component of the backbone of data used for evaluation of the health status of a nation. In Sri Lanka, it is also an integral part of the health information system which supports management of health care, monitoring of disease patterns and evaluation of treatment and prevention.

Over the years, the paper based IMMR system in place has served this purpose to a level of satisfaction but it has increasingly become a difficult proposition with practical and logistical barriers. This has rendered it quite a daunting task to keep up with the expected levels of timeliness, accuracy and relevance. It has become ever more evident in the recent past with the complexities of disease patterns and the role of disease surveillance becoming a “life-saver” during epidemics.

In the quest for a solution, health care information digitization along with a web-based IMMR, as explored in this instance, proved to be a promising tool and a shift in the right direction. The system introduced will pave the way for the “enter once, use many times” concept for all data inputs together with almost unimaginable ways of analysis and presentation.

In the first phase of implementation, the eIMMR is being piloted in six major hospitals in the country, which includes Lady Ridgway Hospital, De Soyza Maternity Hospital, Castle Street Hospital for Women, Sri Jayewardenepura Hospital, Base Hospital Panadura and Rehabilitation Hospital Ragama.

These institutions cover nearly 3% of all discharges per annum in Sri Lanka. So far more than 35,000 records have been entered into the system. In contrast to the manual system, using which the Ministry of Health, was able to produce the, Annual Health Bulletin for 2007, 3 years later in 2010, the implemented electronic version, is able to provide the data required to produce the Annual Health Bulletin from the hospital where it is implemented almost instantly.
This therefore has proven to be far more efficient than its manual counterpart. Further, the data validation rules incorporated in the eIMMR system, ensures the accuracy of the data entered. Review and amendment of data is also facilitated for Medical Record Officers.

The analytical module provides the users functionalities of search, predefined analysis and customisable analysis. The search option gives the users the ability to search data by day or quarter. It also gives an advance search option with optional search criteria. By the predefined analytical option typical and common data representations already included in the Annual Health Bulletin is addressed. The customisable analysis provides an array of analytical possibilities with combinations of required data elements. This option is aimed at providing the required flexibility for data analysis.

The impact of this digital information system on the Sri Lankan health sector has been appreciated with a Special Merit award at the e-Swabhimani 2010 Awards.

With almost real-time information at hand and extrapolations of such into informed predictions, the digital eIMMR system could inevitably become the “crystal ball” for assessing future health needs and disease patterns, in Sri Lanka.

Dr. M.K.D.R.B. Dayaratne
buddika_dayaratne@yahoo.com

Dr. N.C. Kariyawasam
nckariyawasam@slt.net.lk

Supervisor:
Mrs. I.R Bandara
Deputy Director
Medical Statistic Unit
Ministry of Healthcare and Nutrition
Maternal and Child Health Management Information System

According to the World Health Organization about 530,000 women die worldwide from pregnancy related complications annually, with some 68,000 of these deaths resulting from unsafe abortions. At the same time worldwide about 4 million babies die within the first month of life, and more than 3 million die as stillbirths. These figures reflect that much has to be done to improve the Maternal and Child Health Services worldwide.

Sri Lanka has excellent Maternal and Child Health statistics reflecting the efficiency and the efficacy of its Maternal and Child Health Care program. The Family Health Bureau is responsible for program planning, evaluation, research and policy formulation related to Maternal and Child Health Care services in Sri Lanka. The Maternal and Child Care information system however, being a paper-based system, is plagued with the usual problems inherent in such a system.

The proposed system to replace this paper based system was developed by customizing the DHIS2 software package. DHIS2 is recommended by the World Health Organization as the tool for management of aggregated health information. This Software was customized to meet the needs of the Maternal and Child Health program.

Dr. Suboda Manoj
subodha.manoj@gmail.com

Supervisor:
Dr. Chitramalee De Silva
MBBS, MSc, MD
Member, Specialty Board in Biomedical Informatics
Medical Education Informatics
Learning Management System for a Refresher Course in Nursing in the Private Sector

A SWOT analysis of private sector nursing was done and this concluded that there is a dire need for a method of formalizing unregistered nurses. Objectives were then formulated to develop, host and evaluate nurses at the Western Hospital, Borella using an online course. A literature review was done and indicated that current online nursing courses were very basic with little interactivity. Thus the research question, “Can an online LMS with a simple interface and interactive multimedia be useful to train nurses?” was formulated. The online course was hosted on the popular MOODLE platform with one pilot module of a problem based session on “Chronic Cough” created using the ADDIE Process (Analyze, Design, Develop, Implement and Evaluate), HCI (Human Computer Interface) incorporating principles of multimedia with coding being done using HTML and Flash.

21 nurses were given a pre and post project questionnaire. Results were also obtained from Moodle’s built-in logs. Nurses were overwhelmingly in favour of an interactive, multimedia rich, problem based, and online learning experience.

It is recommended that future refresher nursing courses be blended with more efficient lesson plans and more data efficient coding maintaining the interactive elements of the existing lesson. Site: www.westernhospital.lk/moodle

Dr. Rikaz Sheriff
rikaz.sheriff@gmail.com

Supervisors:
Prof. Jayantha Weerasinghe
BDS, MS (Colombo), PhD (Japan)
Member, Specialty Board in Biomedical Informatics

Dr. Gominda Ponnamperuma
MBBS, Dip. Psychology, MMEd (Dundee), PhD (Dundee)
Senior Lecturer in Medical Education
Faculty of Medicine
University of Colombo
Development of an Online Module on “Introduction to Medical Education Informatics” for the MSc in Biomedical Informatics course

At present it is estimated that the emerging field of Biomedical Informatics (BMI) in the Sri Lankan context would need 240 specially trained Medical Officers in Health Informatics in the public sector alone. Therefore a sustainable training program for this specialty is an urgent need for the Sri Lankan public health sector.

The face to face MSc training program conducted by the Postgraduate Institute of Medicine at present encounters certain practical difficulties such as lack of adequate laboratory facilities and lecture halls and shortage of expert trainers at the PGIM, etc.

On the other hand, online programs are becoming more popular, effective and acceptable worldwide as well as in Sri Lanka and seem to better address the issues mentioned above. In this context, it would be timely to develop, test and evaluate the effectiveness of an online training program for the MSc Biomedical Informatics course for future post graduate trainees.

This work involved the process pertaining to the conversion of the existing face to face module on “Introduction to Medical Education Informatics” to an online learning module. Following a literature review and interviews with stakeholders the needs, content, teaching and learning methods, educational strategies and outcomes were identified. A learner centered module on “Introduction to Medical Education Informatics” was designed and is being developed based on the ASSURE model while incorporating the principles of curriculum design, human behaviorism, adult learning and web design. The entire process is being developed according to the ADDIE process on MOODLE which is a free and open source platform. It will be evaluated at the level two of the Kirkpatrick’s hierarchy after implementation.

Dr. Udara Ariyasinghe
udaraa@hotmail.com

Supervisor:
Prof. Nandani De Silva
Chair and Senior Professor of Family Medicine
University of Kelaniya

Dr. Gominda Ponnampuruma
MBBS, Dip. Psychology, MMEd (Dundee) PhD (Dundee)
Senior Lecturer in Medical Education
Faculty of Medicine
University of Colombo
Web based Curriculum for a Biomedical Informatics Course: Designing, Development, Implementation and Evaluation of an Electronic Health Record System module

Online learning is also called web based learning. Now most of the specialties in Medicine are using the Internet to deliver their course content online. Biomedical Informatics is a new specialty of Medicine formed by the integration of Medicine, Biology, Informatics and Computer Science. The Postgraduate Institute of Medicine is conducting the M.Sc in Biomedical Informatics course. The entire course is currently being conducted through face to face teaching sessions.

A literature review has been done and a needs analysis of students along with a feasibility study helped to determine the following project objectives 1) Designing a web based learning course for the 2nd semester curriculum of the M.Sc in Biomedical Informatics 2) Course implementation and 3) Course Evaluation. according to Kirkpatrick’s model up to level 2. Moodle was selected as a hosting platform. Moodle is an open source learning management system. It can be easily customized and it is popularly used in Sri Lanka.

Human–Computer interaction with multimedia integration played a role in designing and development aspects of the course. Three students from biomedical informatics course took part in a pilot implementation. Results of the evolutions, surveys and quizzes showed that material given to them was relevant and that they were satisfied with the user interface design of the course.

The sample size included in this pilot study was small. Further studies needs to be conducted with larger sample sizes. However results of this project displayed that the web based Biomedical Informatics course can be conducted with limited resources by applying the relevant principles of designing, development, implementation, and evaluation.
Bioinformatics
Sri Lankan Human Genome Project

The Specialty Board in Biomedical Informatics is proud to announce that it initiated the project and successfully sequenced the first Sri Lankan Human Genome.

In 1953 an American James Watson and an Englishman Francis Crick described the elegant structure of our genetic code, the DNA double helix. Fifty years later the ‘Human Genome Project’ succeeded in describing the 3 billion letters that are found in our genetic code completing the Human Genome. The Human Genome Project was an enormous collaboration between six leading nations of the world and over 1000 of the world’s best and the brightest scientists from multitude of fields. It took thirteen years and three billion dollars to complete the project. Advances in technology since then has made it possible today to sequence a Human Genome in a very short period of time, at a fraction of the cost, and with minimal manpower.

The Sri Lankan Human Genome Project was launched using illumina sequencing technology in collaboration with the Institute of Genomics and Integrative Biology, New Delhi, India by the Specialty Board in Biomedical Informatics of the Postgraduate Institute of Medicine, University of Colombo. The first Sri Lankan Human Genome sequenced came from a Sinhalese man with both upcountry and low country heritage. The project will be extended to cover other ethnicities as well in the years to come.

Alignment of the Sri Lankan Human Genome to the NCBI Reference Human Genome, disclosed 3.42 million Single Nucleotide variations including 250,463 novel variations and 488,921 deletion or insertion polymorphisms (InDels).

The Biomedical Informatics group will continue to analyze the data generated to make sense of the vast amount of information available in the Sri Lankan Human Genome. The data were made accessible to all scientific groups in the country to analyse, explore, and make their discoveries freely available to the scientific and the medical communities.

The Sri Lankan Human Genome is Sri Lanka’s contribution to the growing pool of scientific knowledge on genomes. With the launch of the Sri Lankan Human Genome, genetic research in Sri Lanka has truly entered the post genomic era. Let us join hands to ensure that the scientific discoveries that we make when we analyse our genome benefit the Sri Lankan society at large.

The Sri Lankan Human Genome can be accessed at http://www.srilankangenome.net.
Launch of the Sri Lankan Human Genome on 10 December 2010 at the Annual Scientific Sessions of the Sri Lanka Association for the Advancement of Science in Colombo, Sri Lanka. The hard disk containing the Sri Lankan Human Genome is being handed over to the Senior Minister of Science and Technology Hon. Prof. Tissa Vitharana by Prof. Vajira H. W. Dissanayake and Dr. Rajesh Gokahal, Director IGIB, India.

Software Upgrade of the Sri Lankan Genome Variation Database

The Sri Lankan Genome Variation Database is a web based repository of Single Nucleotide Polymorphisms present in major ethnics groups of Sri Lanka. This was created and hosted by the Human Genetics Unit, Faculty of Medicine, University of Colombo, Sri Lanka.

An upgrade of database software was planned to enhance the efficacy, usability and stability of the Sri Lankan Genome Variation Database by the means of upgrading the data model, introducing novel functionality and implementing a stable web architecture.

Following an existing system study and requirement analysis, a Software Requirement Specification and a Data Mini World definition was prepared. Mini World definition was mapped into an Extended Entity Relationship model, which was finally mapped into a MySQL relational database. Based on the Software Requirement Specification, business components were modeled with Unified Modeling Language. Using this model software components were developed with the PHP 5.0 platform, based on the Model-View-Controller design architecture. Web application was deployed and tested on an Apache web server.

The major functional improvements were new multiple SNP search criteria, graphical SNP representation based on dbSNP (Short Variation Database, National Centre for Biotechnology Information, USA) graphical user interface architecture, including chromosome ideograms, representation of flank sequences and gene models. An online data submission process was also introduced to the database.

Data quality was improved with multiple new SNP feature annotations comprising of clinical significance, clinical sources, molecular types, variation class, functional class, primary genome assembly mapping and gene models.

The database can be accessed through the following URL.
http://www.hgucolombo.org/SLGVD

Dr. M.P.N.S. Cooray
mpnscooray@yahoo.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Assessing Gene-Gene Interaction in Type 2 Diabetes Mellitus Using Centrality Measures

In almost all the multifactorial human disease-gene associated databases, genes are ranked according to the number of articles published in journals. Type II Diabetes Mellitus (T2DM) is a life threatening condition. According to current knowledge predicted genetic contribution to T2DM is about 24%.

Future genetic studies into T2DM can be facilitated by scientifically predicting T2DM associated genes using bioinformatics tools. One such method is the creation of a gene-gene interaction map for T2DM. Analysis of this map would enable researchers to target their research in the future at genes most likely to be involved in the aetiology of T2DM.

A new data base was created with the selected gene list for T2DM from the T2DGAD. This list was curated with the HGNC (HUGO Gene Nomenclature Committee) set of genes for further accuracy. The result was entered to the STRING database to generate the interaction map. The data on the interaction map was used in Cytoscape to create the centrality measures by one of its core-plug-ins - ‘Network Analyzer’.

The Principal Component Analysis method was applied for the result after standardization. Then the genes were ranked according to the index generated by considering 6 centrality measures. The interaction data were incorporated into the database for further studies. A graphical user interface was developed to provide important information for the users who are interested in further studies.

Dr. Saminda M. Dharmaratne
samindamadhu.lk@gmail.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Annotation of the Sri Lankan Human Genome and a Network Approach to Disease Gene Identification in Relation to Low Birth Weight

Low birth weight is a complex multi-factorial trait which results in high mortality and morbidity in newborns. It is also associated with chronic diseases in adult life. A number of studies have shown that genetic factors influence birth weight. However little is known about the specific genes involved. Gene identification is of utmost importance to gain a better understanding of the pathways that regulate fetal growth and maternal metabolism in pregnancy. It will allow discovering susceptibility genes for chronic diseases later in life.

In this study, the network approach was selected to identify and prioritize disease genes associated with low birth weight. Using two main online tools - Gene Prospector and Cytoscape - a gene-gene interaction network was generated. The resulted network was curated using an already available “Gene Knowledge Base” for the disease. This resulted in the creation of a low birth weight specific gene-gene interaction network. The network was analyzed based on the degree of connection. Low birth weight associated single nucleotide polymorphisms were found by literature surveying and mapped with the Sri Lankan Human Genome Single Nucleotide Polymorphism (SNP) profile.

As a result, ten low birth weight specific genes and ten diseases specific SNPs were identified. Four of these SNPs rs7903146, rs10882102, rs8191754, rs10882102 and rs4929984 were identified in the Sri Lankan Human Genome SNP profile. This information would be useful for genetic researchers who want to study the genetics of low birth weight in the Sri Lankan population.

Dr. P.H.C. Kumanayake
ckumanayake@yahoo.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Identification of Gene Interactions Associated with Stroke using Bioinformatics

Integration of various types of data and information available in various data repositories maintained for different purposes is a timely requirement to bridge the gap between bioinformaticians and physicians. A disease associated gene interaction network for stroke was developed with this in mind.

HuGE Navigator, OMIM and Genecards were searched to identify a core gene set associated with stroke and 596 unique genes were found. After a ranking process, the top most 15 genes were selected to identify interactions. These 15 genes were analyzed against the STRING database to establish the interactor genes. This process resulted in an average of 9.47 interactor genes with a confidence score of more than 0.9, per each core gene. However, genes associated with stroke had an average of 4.39 per each core gene after mapping them against HuGE Navigator disease list. Using the above data, a network made up of 68 nodes and 65 edges with 6 connected components was created. To facilitate data analysis and to publish results, first information was captured into a database and processing was performed on the stored data. The findings of this work can be the starting point for future studies into genetics of stroke.

Dr. V.S. Weerasekara
vsamanthi@yahoo.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Identifying a Gene-Gene Interaction Network for Pre-eclampsia Using Text Mining of PubMed Abstracts

Pre-eclampsia is a hypertensive disorder in pregnancy which has a genetic component, and different genes interact with each other to bring about pre-eclampsia. Most recent data on gene-gene interactions can only be found in scientific literature. However, manual reading of all the literature to find specific information is now becoming impractical due to the ever expanding volume of literature.

In the current study, this problem was approached by applying text mining methods on PubMed abstracts. Relevant abstracts were retrieved from PubMed and sentence boundary detection was performed using the GeniaSS tool. Tokenizing and entity recognition were done using the GeniaTagger tool. Gene name normalization was done using a gene name dictionary created for the current work. A sentence which has more than one unique gene symbol and at least one interaction word was selected as a candidate sentence for further processing. Information was extracted by reading candidate sentences and a gene-gene interaction network was created.

457 sentences were selected as candidate sentences out of 11172 sentences found in 1188 abstracts. 42 sentences were found to be describing gene-gene interactions. There were 59 genes involved in 51 interactions. This approach was evaluated using a sample of 45 abstracts which had 435 sentences. It showed 61.5% recall and 28.5% precision. The current approach showed promising results, and it significantly reduced the manual reading work load.

Dr. H.W.M.M Hapudeniya
mmhapudeniya@gmail.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Visually Exploring the Gene Interaction Network in a Polygenic, Complex, Multifactorial Disease: Essential Hypertension

Human essential hypertension (EH) is a complex, multifactorial disorder with genetic, environmental and demographic factors contribute to its aetiology and pathogenesis. It is estimated that globally, there will 1.56 billion people affected with the condition by the year 2025. It has been shown that multiple interactions exist among multiple genes in pathogenesis of essential hypertension.

Epistasis is defined simply as ‘interaction with different genes’. The more common polygenic form of essential hypertension develops as a consequences of epistasis. This work started with the identification of candidate genes associated with essential hypertension. For this purpose, abstracts published in PubMed database from 01/January/2000 to 01/December/2010 were used. There were 1105 abstracts. From these abstracts, a set of genes consisting of 153 essential hypertension related genes was created manually. Then a subset of ten genes was selected based on a scoring system using gene prospector. As the next step, a gene interaction network was created using Cytoscape. The elimination of the second hierarchical level of the network was done thereafter. The ultimate results gave a gene interaction network with first hierarchical level and statistical analysis.

This gene interaction network is important in many ways. The finding of genes related to pathogenesis of essential hypertension is an exhausting task because relevant information in the biomedical literature remains hidden in the form of unstructured text. The other problem is that determining disease-related genes requires laborious experiments. Therefore predicting candidate genes before experimental analysis will save time effort and cost as well.

Dr. Kamal Seneviratne
kamalse1@gmail.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Identifying and Visualizing Gene-Gene Interactions Associated With Myocardial Infarction

Myocardial infarction is an important clinical problem because of its large contribution to mortality. Recent studies have shown the importance of genetic factors and the interaction between multiple genes and environmental factors in the susceptibility to the disease. Disease prevention is an important strategy for reducing the overall burden of myocardial infarction, with the identification of markers for disease risk being key for both risk prediction and for potential intervention to lower the chance of future events. The increasing availability and diversity of omics (genomics and proteomics) data in the post-genomic era from various interaction studies offers new perspectives in most areas of biomedical research.

This study, was aimed at identifying the interactions between the various genes associated with myocardial infarction, using data retrieved from high-throughput experiments and literature available from databases such as HuGE Navigator, Online Mendelian Inheritance in Man Morbid Map, PubMed and GeneCards. Graph-based biological networks models capture the topology of the functional relationships between molecular entities such as gene, protein and small compounds and provide a suitable framework for integrating and analyzing these data. The genes associated with myocardial infarction were identified from the biological data repositories and their interaction was visualized using, BisoGenet, one of the plugins of Cytoscape, an open-source software.

The interaction network of the six most important genes (nodes with more connections) that were found to interact and affect the susceptibility to myocardial infarction was visualized using Cytoscape.

These interactions could provide new insights into the multigenic architecture of myocardial infarction. Furthermore, it may be possible to prevent an individual from having myocardial infarction by medical intervention based on his or her genotype for specific polymorphisms. BisoGenet, the tool that was selected was use to build and visualize biological networks in a fast and user-friendly manner.

Dr. K Thavayogarajah

thavasabapathy@hotmail.com

Supervisors:

Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Identification of Gene Interactions Associated with Breast Cancer

A complex disease such as breast cancer has a multigenic aetiology. Discovering breast cancer specific genes require laborious and time consuming laboratory experiments. Therefore, it is a good idea to identify an appropriate initial set of genes that can be useful to perform appropriate laboratory experiments.

This work was conducted to identify such genes by studying gene-gene interactions. Literature based gene-gene interaction identification was carried out manually to extract gene-gene interactions from PubMed abstracts. Then, a gene-gene interaction network was visualized using the Cytoscape visualization tool. Gene ranking was done using network analysis. The gene-gene interaction network was used as a base for the development of an interactive web-based module to access gene information.

Dr. W.F.D. Ananda
fdananda1234@gmail.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
Comparison of the Sri Lankan Human Genome with Two Other Human Genomes Based on Single Nucleotide Polymorphisms

Many personal genomes and their variation data are publicly available. Sequencing of the genome of an anonymous Sri Lankan individual allowed comparing it with the other personal genomes as the starting point in understanding how much the Sri Lankan genome is similar to or different from them. This could be done in several ways. One approach to do this was to compare the single nucleotide polymorphism (SNP) profiles of the Sri Lankan Human Genome with other published genomes.

An analysis pipeline was devised using online bioinformatics tools and databases for the comparison of the Sri Lankan Human Genome with James Watson’s personal genome and an anonymous Chinese individual’s genome. The SNP data of a selectively neutral one hundred thousand base pair region of the three genomes was converted into comparable data sets using the analysis pipeline and compared. Out of 188 SNPs in the selected region of the Sri Lankan Human Genome 166 mapping to dbSNP 131 build were considered for the analysis. James Watson’s genome had 158 SNPs and the Chinese genome had 115 SNPs mapping to dbSNP 131 build. Out of 166 SNPs we share 100 with James Watson and 67 with the Chinese genome. 50 SNPs were shared with both.

This methodology can be used to compare a region of interest in many personal genomes simultaneously and perform intra-species genome wide comparisons. It relieves the researcher from the need to update the databases and tools at the user end.

A computational infrastructure to compare thousands of genotypes and phenotypes will be needed as genomics moves beyond the current goal of one genome per person to multiple genomes per person. Till such a computational infrastructure is available to the individual researcher a simple methodology like this is recommended.

Dr. G. M. K. Perera
modithabhp72@yahoo.com

Supervisors:
Prof. Vajira H. W. Dissanayake
MBBS, PhD (Nottingham)
Chairperson, Specialty Board in Biomedical Informatics

Mr. Pubudu Samarakoon
BSc, MSc (Bioinformatics)
Member, Specialty Board in Biomedical Informatics
The Sri Lanka Journal of Biomedical Informatics is the a peer reviewed open access online journal of the Specialty Board in Biomedical Informatics and the Health informatics Society of Sri Lanka. It was launched on January 2010. It is published four times a year.

http://www.sljol.info/index.php/SLJBMI
Photo Gallery
A meeting with the Vice Chancellor Prof. Kshanika Hirimburegama by Staff from the International Office and Department of Informatics of the University of Oslo during a visit to the University of Colombo in October 2008.

Entrance MCQ Exam of the BMI 1st Batch

First lecture of BMI 1st Batch delivered by Prof Vajira H.W. Dissanayake 2009-06-01
Prof. Sandeep Sahay addressing the students

Annual BMI Get-together

Annual BMI Get-together
Acknowledgements

The MSc in Biomedical Informatics course is funded by a NOMA grant from Norad, which is managed by the Norwegian Centre for International Corporation in higher education.

The MSc in Biomedical Informatics course would not have been possible without the valuable contribution of many individuals. The Director, PGIM; the Specialty Board in Biomedical Informatics, and the trainees would like to thank the following persons for their contribution to make this all happen.

- Honourable Maithreepala Sirisen, Minister of Health
- Honourable Nimapl Siripala De Silva, Former Minister of Healthcare and Nutrition
- Honourable Tissa Vitharana, Senior Minister of Science & Technology
- Prof. Kshanika Hirimbregama, Vice Chancellor, University of Colombo
- Dr. Ravindra Ruberu, Secretary, Ministry of Health
- Dr. Athula Kahandaliyanage, Former Secretary, Ministry of Health
- Dr. Ajith Mendis, Director General of Health Services, Department of Health Services
- Dr. Wimal Jayantha, Deputy Director General (Planning), Department of Health Services
- Director and staff of the National Institute of Health Sciences, Kaluthara
- All other Deputy Director Generals, Directors, Deputy Directors and Heads of Institutions of the Ministry of Health who supported student projects
- Members of the Board of Management of the Postgraduate Institute of Medicine
- Members of the Multidisciplinary Board of Study, Postgraduate Institute of Medicine
- Staff of the Postgraduate Institute of Medicine
- Prof. Jens Kaasbøll, Prof. Jørn Braa and Ms. Anne Cathrine Modahl, Department of Informatics, University of Oslo, Norway
- Ms. Guri Vestad and Ms. Jeanette J Da Silva, International Office, University of Oslo, Norway
- Prof. Rohan W Jayasekara, Chair, Senior Professor and Head of Department of Anatomy and the academic and non-academic staff of the Department of Anatomy and the Human Genetics Unit
- Dr. Rohan Jayasuriya, University of Wollongong, Australia
- This book was designed and typeset by Dr. Prasad Ranatunga