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SEEING THE LIGHT: A GLIMPSE INTO OPTICAL FIBRES

This month begins a new regular feature in Research Matters, where the work of a specific VU researcher is showcased.

This series begins with the spotlight on one of VU's Postdoctoral Fellows, Fotios Sidiroglou, from the Centre for Telecommunication and Microelectronics.

Fotios's work centres around two areas of optical fibre technology. The first is developing manufacturing processes for optical fibres – the tiny tubes of insulated glass that transmit information faster and further than any other technology.

As Fotios says, "Fibre optics are used not just as transmitters of information, but as lasers and sensors in medicine, the environment, the industrial sector and electronics. The better these wires are understood and created, the better they can continue to be developed, and their application for community benefit is enormous."

Fotios's other area of research is fibre optic sensors. Small in size and not requiring of electrical power, fibre optic sensors can be used for measuring strain, temperature, pressure or other quantities by the modification of the fibres inside the tiny insulated tubes.

"Fibre optic sensors are able to reach places and measure quantities in a way no other technology is able. The sensors have a wide variety of uses, from measuring the temperature inside jet engines to providing monitoring for alarm systems to measuring traces amounts of a particular gas in the air."

Fotios's work requires cutting edge technology, which has revolutionised industry with fibre optic machines replacing many dangerous and difficult precision jobs. It has allowed the development of

minimally invasive surgeries and in the same way is used to see into areas that are otherwise impossible to reach, the inside of a jet engine for instance. The most well-known use of fibre optics is the increased speed and reliability they have given to broadband internet.

Fotios says that working in this field has many challenges: "A fibre optic light can burn holes through almost anything, and the laboratory experiments required can be precarious."

Currently in the final year of his Postdoctoral Fellowship, Fotios plans to continue his work at Victoria University where he also completed his undergraduate degree. Fotios is intent on "expanding the horizons of his research," continuing to contribute to the important changes in technology and vital services that fibre optic research is developing.



Dr Fotios Sidiroglou, Postdoctoral Research Fellow, CTME.

'WHO IS ACTIVE IN DIABETES PREVENTION'

Dr Rizwana Kousar is a research fellow for the Australian Community Centre for Diabetes (ACCD). She is currently working in a community development engagement and education role with South Asian Communities.

The ACCD is extremely proud that Rizwana was featured in the January 2011 edition of the International Directory-'Who is Active in Diabetes Prevention'. This Newsletter published from Dresden Germany links thousands of clinicians, educators, researchers and project staff from around the world in their mission of diabetes prevention.

Dr Kousar gained her PhD from Victoria University in 2008, after completing her Honours degree in Biomedical Science in 2001. She also holds a Medical degree from Pakistan, as well as a Diploma in Assessment and Workplace Training (2004). Having undertaken medical training, Dr Kousar has the general knowledge, skills and a thorough understanding of the physiology of diabetes and its risk factors. Before joining the ACCD, Dr. Kousar taught within the faculty of Engineering and Health Sciences at Victoria University. Between 2000 and 2008 she managed successfully to work as a student academic and researcher across multiple disciplines.

Dr Kousar's PhD specialised in Pre-Diabetes and Obesity and she is the first Australasian researcher to focus on non-communicable diseases in South Asians (Pakistani communities) and she has a strong track record of successful and relevant health services research.

When Dr Kousar started her PhD research no international studies had focused on metabolic syndrome/pre-diabetes in Pakistani women. Pre-existing research highlighted mortality rates of cardiovascular disease, being higher for Pakistani women than for Pakistani men. Worldwide, there are large South Asian communities in Western countries. Cardiovascular disease and type 2 diabetes are highly prevalent in migrant South Asians. The limited amount of research undertaken to explain these higher rates has identified contributory factors which include the stresses of migration and settlement and the adoption of a more sedentary lifestyle. Through her research Dr Kousar was successful in preventing the onset and/or reducing the severity of Metabolic Syndrome and possibly the sequels of type 2 diabetes and cardiovascular disease in Pakistani females.

Dr. Kousar has considerable expertise in chronic disease management through diet and lifestyle modification and particular strength in working with members of Culturally and Linguistically Diverse communities. She was appointed as a research fellow at the ACCD in 2009, where she developed and piloted a diabetes education program with female bilingual health educators from 13 differing language groups. Participants were selected according to their interest and connection to their community, and ranged from health and community workers, to unpaid volunteers within newly arrived migrant communities.

Dr. Kousar developed an education program that enabled non-professional community workers to learn about the causes and complications of diabetes and its prevention and management, and also to develop diabetes education programs within their communities. These programs combined evidence collection with culturally appropriate information sharing in an accessible and meaningful way. Since the program, three participants received funding from Brimbank Council to run diabetes prevention programs with their communities.

Dr. Kousar continues to work at the ACCD on program development, researching diabetes awareness and prevention in Melbourne's South Asian communities. In combining evidenced based research on the causes and factors influencing high-risk populations and diabetes with community development to enable populations to address many of the social and lifestyle factors, the ACCD offers a specialised approach to addressing the prevalence of diabetes within culturally and Linguistically Diverse communities.



'Who is Active in Diabetes Prevention'

Multi-disciplinary research team working at the Australian Community Centre for Diabetes (ACCD)

A NEW LEASE ON LIFE FOR INDUSTRIAL WASTEWATER

A VICTORIA UNIVERSITY TEAM OF RESEARCHERS IS WORKING ON A MEMBRANE BASED WATER TREATMENT SYSTEM THAT IS LIKELY TO REVOLUTIONISE THE TREATMENT OF WASTEWATER IN INDUSTRIAL SETTINGS.

Often by necessity, heavy industry typically can use significant amounts of water in its operations and processes. A research team from Victoria University has been awarded funding from the Smart Water Fund to investigate whether membrane distillation could be used on a large industrial scale to recover water and re-use it in a commercially sustainable way.

The project was also supported by Victoria University, Integrated Elements, City West Water, GWM Water, and Water Quality Research Australia.

Associate Professor Mikel Duke, Principal Research Fellow at the Institute for Sustainability and Innovation at Victoria University, said the membrane distillation process uses a special type of membrane which allows water to distil through the membrane itself, resulting in the extraction of very high quality water.

"All industrial processes have to eventually dispose of some water, and that water usually contains a range of salts and minerals, often meaning it's not suitable for re-use," said A/Prof Duke.

"We have so far shown that membrane distillation is able to extract fresh water on a small scale, and through this project we've transferred the technology from the lab towards a commercial reality.

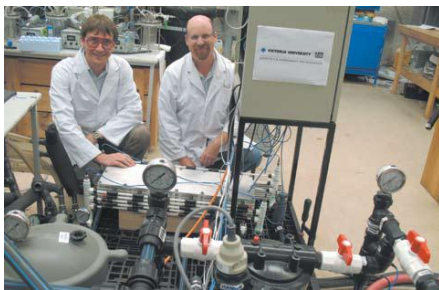
"We now have a real pilot sized version of the technology which means that in the near future, we'll be able to use membrane distillation not only to prevent water from an industrial process going into the sewer but also to put the recycled water to other uses and thereby reduce the need to bring in more fresh water into the process."

The research team has looked at a range of industrial sites around Melbourne including power generators, chemical manufacturers and food processors, all of which typically have heating and cooling cycles in their processes.

"The residual waste heat from these industrial processes plays a role in powering the membrane distillation, so not only are we recovering high quality, usable water, but we're using an existing power source without increasing carbon emissions in the process," said A/Prof Duke.

The team believes they are now at the point where the technology can be applied to almost any major industry.

"We have to look at each case individually, but in the near future I certainly see plenty of opportunities for utilising industrial heat to recycle more water internally, eventually completely cutting off the need for any liquid waste to go down the drain," said A/Prof Duke.



The project team including Mikel Duke and Noel Dow have developed a membrane distillation pilot system.

The statistical filters developed in this project are based on the binomial distribution, Poisson distribution and normal distribution, although the main focus is the binomial case. Using a specific protocol, a library of DNA fragments is prepared. From this library, a subset is randomly sampled and for each of the sampled fragments, a part of it, called a short read, is sequenced providing a tag. The tag is then mapped to one or many matching locations in an a priori known reference DNA sequence, e.g. the human genome. The proportion of reads in the library with mappable tags can be modelled as a binomial random variable, and hence Poisson distribution (when the proportion is small), and normal distribution (approximating the distribution in a neighbourhood of the mean). We are interested in the reference genome locations where significant over/under-representation of the mapped tags occur, so called peaks or peak ranges, as these can be interpreted as evidence for some specific property of DNA or its epigenetic modifications.



Professor Pietro Cerone, VU; Dr Adam Kowalczyk, National ICT Australia Victoria Laboratory; and intern Dr Eder Kikianty, VU.

applications of web mining, and the issue of how to incorporate web mining into web personalization and recommendation systems are also reviewed. Additionally, the volume explores web community mining and analysis to find the structural, organizational and temporal developments of web communities and reveal the societal sense of individuals or communities.

The volume will benefit both academic and industry communities interested in the techniques and applications of web search, web data management, web mining and web knowledge discovery, as well as web community and social network analysis.

Prof. Yanchun Zhang is the director of the Centre for Applied Informatics. Dr. Guandong Xu is a newly appointed research fellow in CAI. He was a recipient of 2009 VC Citation Award of Excellence in Research and Research Training category.



SUCCESSFUL STUDENT-KRISTINA NELSON

After nursing her mother in a losing battle with breast cancer, Kristina Nelson left a career in the business sector to follow her life-long interest in human health and nutrition. Inspired by her mother's determination, Kristina embarked on a new direction, studying full time to recently complete a Bachelor of Science (Nutritional Therapy) at Victoria University. Based on her academic performance Kristina was the recipient of 2 FOHES Summer research scholarships during her 2nd and 3rd undergraduate years, and presented her findings on the effects of food supplements against biological markers in menopause at an international conference in Sydney last September.

She has also recently received a prestigious Cancer Council Victoria Studentship to work at the Burnet Institute's Cancer and Immunology laboratory whereby she examined the effects of several food supplements in breast and colon cancer cell lines. Kristina is continuing her studies this year, undertaking Honours in Biomedical Sciences at VU, conducting a clinical trial that measures the biological effects of a breakfast intervention in

NEWS FROM FACULTY OF HEALTH, ENGINEERING AND SCIENCE

AMSI INTERNSHIP

Project Title: Margin Statistics of High Throughput Sequencing

Mentor: Professor Pietro Cerone, Victoria University
Intern: Dr. Eder Kikianty, Victoria University
Industry partner: Dr. Adam Kowalczyk, National ICT Australia Victoria Laboratory.

This project will pursue the development of statistical filters that can be used to detect biomarkers, e.g. DNA loci or its epigenetic modifications, reliably differentiating between various phenotypes of biomedical interest, in particular a disease variant or predisposition to develop a disease. The method focuses on analysis of data obtained by the high throughput DNA sequencing technologies (often referred to as Next Generation Sequencing, NGS). The results will be applied directly to a number of diseases studied at laboratories of NICTA partners, in particular to breast cancer, leukaemia and diabetes.

NEW BOOK: WEB MINING AND SOCIAL NETWORKING: TECHNIQUES AND APPLICATIONS

Title:

G. Xu, Y. Zhang, L. Li, Web Mining and Social Networking: Techniques and Applications, ISBN 978-1-4419-7734-2, Springer, 2010.

Dr. Guandong Xu and Prof. Yanchun Zhang from Centre of Applied Informatics (CAI), have published a new monograph with the title of "Web Mining & Social Networking: Techniques & Applications" via the prestigious Springer Publisher. This new book reflects their latest research advance on the topics of Web mining and social networking. And particularly, the book examines the techniques and applications involved in the Web Mining, Web Personalization and Recommendation and Web Community Analysis domains, including a detailed presentation of the principles, developed algorithms, and systems of the research in these areas. The

people with obesity.

Kristina is continually fascinated by the connection between lifestyle, diet and health, and says that “we now have a body of convincing or at least probable scientific evidence that suggests certain diets, foods or plant chemicals can be both causative and preventative in cancer and chronic diseases such as obesity”. Kristina favours an evidence-based approach supported by science and established guidelines, and encourages all people where possible to take responsibility for their own wellbeing through healthy eating, physical activity and a balanced approach to life.

Living with her young family in the Macedon Ranges, Kristina is looking forward to combining a career in research and clinical nutrition, saying “we never stop learning, and I am passionate about contributing to the growing body of scientific nutrition knowledge whilst supporting others in meeting their personal goals to enjoy the best health possible.



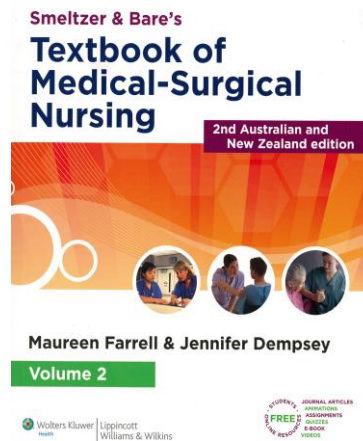
Kristina Nelson (centre) with her principal Victoria University supervisor Professor Lily Stojanovska (left) and her Burnet Institute supervisor Professor Vasso Apostolopoulos (right).

INTRODUCING THE 2ND EDITION OF SMELTZER & BARE'S TEXTBOOK OF MEDICAL-SURGICAL NURSING

AUTHORED BY VICTORIA UNIVERSITY'S OWN DR MAUREEN FARRELL

Dr Farrell is a senior lecturer within the School of Nursing and Midwifery at Victoria University and has over 25 years experience as an academic and nurse in the health care sector. She has an impressive track record in the development of quality educational projects that have benefited the nursing discipline, the clients/patients, other healthcare professionals, and members of the wider community.

Research activities include a current ARC Linkage Research Grant, where Dr Farrell is the Chief Investigator, and the study is examining the use of wireless mobile technologies in the acute care area. Dr Farrell has also led and been a team member of many other successful educational and research projects. The findings from these have been published in national and international journals.



CARIBBEAN NARRATIVES

Dr Karina Smith, Lecturer in Literary and Gender Studies, School of Communication and the Arts, recently co-convoked the Australian Association for Caribbean Studies (AACS) international biennial conference with Dr Rhona Hammond (independent scholar) at the WEA Hunter in Newcastle, NSW from February 16-18th, 2011. The theme of the conference was Caribbean Narratives of Race, Place and Migration. Three keynote speakers presented at the conference: Professor Karen Fog Olwig (University of Copenhagen), Professor Helen Tiffin (Formerly University of Queensland), and Professor John Maynard (University of Newcastle). The next AACS conference will be held at La Trobe University in 2013.

AURA SURROUNDS RESEARCHER'S HAUNTING EXHIBITION

A journal paper about the idea of 'Aura' and the ability to see hidden meanings in family photos has led to a haunting art exhibition in VU's Artspace at the Flinders Street campus.

The exhibition, which displays works by 13 artists (five of them VU employees), unveils a treasure trove of haunted photographs, videos and objects related to their own lives and those of their families.

Entitled Aura: the Haunted Image, the show features works including projections onto dressmakers' dummies, a cardboard museum display case and a paper tank, as well as photo booth snaps, videos, manipulated photographs and cyanotypes (blueprints).

Featuring established artists and first-time exhibitors, the show exposes the ghosts hidden within the works: lingering afterlives resonant with memories of past ruptures, both personal and historical.

Work-based Education Research Centre (WERC) senior educator Stefan Schutt curated the exhibition after writing a journal paper about Aura with PhD supervisor Dr Marsha Berry.

Mr Schutt has his own installation on display at the exhibition which revolves around Small Histories, an online web-based software system for the uploading and sharing of life stories.

“I created Small Histories to explore the ways in which the internet can facilitate the urge to tell, share and compare one's personal history and, by doing so, generate an online network of interlinked personal narratives connected to historical times, events and places,” he says.

“We hope that the exhibition will connect with the emotional power exuded by the family-related images and objects on display, and that it will strike a chord so that they reflect on their own sense of who they are and where they come from.”

Mr Schutt says he has moved “outside the comfort zone” for this exhibition.

“I've been a musician for most of my life and a writer for the same, both creative and commercial. Although I was very much into art at school, I haven't followed up on it much since. It is a great experience for me to be able to exhibit alongside a group of very experienced and powerful artists.”

The exhibition runs until 8 April at the Level 17 Artspace, Victoria University, 300 Flinders St, city. Gallery opening hours are 10am-5pm, Monday to Friday.



STUDY UNCOVERS ETHNIC TRAP FOR MARKETERS

Migrants and ethnic groups who are marginalised or alienated in their adopted country are likely to resist purchasing products that are closely associated with their new homeland, a Victoria University study has found.

The groundbreaking research by Dr Alexander Josiassen was published this month in the prestigious US-based Journal of Marketing.

“Tying a product to national identity has been a strong marketing pitch for many renowned brands throughout the world,” Dr Josiassen says. “German engineering and Mercedes, US sporting heroes and Nike are two obvious examples.”

“However, resistance to these kinds of products by marginalised groups is clearly demonstrated in my research in The Netherlands.”

Dr Josiassen surveyed 1534 second-generation migrants for his study and formulated a “consumer disidentification” model from his results.

“The results have widespread implications for domestic markets in which there are large numbers of migrants and new arrivals or disaffected indigenous groups,” he says.

“With a highly mobile international population, it is likely that there will be increasing implications for marketing strategies.

“In Australia we have experienced tension between Muslim Australians and their European counterparts as evidenced during the Cronulla Beach riots in Sydney a few years ago, and the ongoing disaffection of large numbers of Aboriginal people from the

dominant European culture.

“We now know that these tensions are likely to affect purchases of a wide range of domestic Australian products, from food and beverages to travel.”

“If we extrapolate further, it may also have implications for other marginalised groups, such as doves and peace activists in a hawkish country such as the United States.”

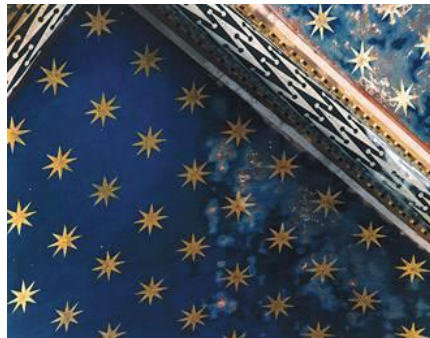
Dr Josiassen’s paper can be viewed in the March edition of the Journal of Marketing, produced by the American Marketing Association.

JO-ANNE DUGGAN – A WONDROUS POSSESSION

Jo-Anne Duggan, one of our recent Postdoctoral Fellows from the Faculty of Arts, Education and Human Development died on Tuesday 8 March from pancreatic cancer.

Jo-Anne was a researcher and artist; her work focussed on examining history through contemporary perspectives. The significance of her work was clearly acknowledged through the residencies Jo-Anne was invited to participate in Milan, Florence and Prato in Italy, and the numerous prestigious grants she was recipient of. Jo-Anne will be greatly missed by her friends and colleagues at VU.

The University has purchased two of her beautiful artworks, through which her talent and memory will live on.



Impossible Gaze #1

*Origin: Room L – The Carrand Room
Museo Nazionale del Bargello*

THANK YOU to all who contributed to the content of the Research Matters bulletin. 😊