



# PALIWANAGAN SA UP DILIMAN

## Book of Abstracts

5 SEPTEMBER 2012  
OVCRD COLLOQUIUM AND FAIR

### *About the Colloquium and Fair*

The *Colloquium and Fair* is one of two events organized by the Office of the Vice-Chancellor for Research and Development (OVCRD) that have, as their primary public, the UP Diliman community itself. As such, these events are collectively called *Paliwanagan sa UP Diliman*.

The first *Paliwanagan* was held on 16 January 2012. For this *Paliwanagan*, the OVCRD held a Colloquium that featured research presentations of selected recipients of the UP Diliman's Open Grants and Source of Solutions (SOS) Grants. As a parallel event, booths showcasing UP Diliman publications and the publications of its R&D partners were set up in the Colloquium venue.

The 5 September *Paliwanagan* is larger in scale than the January event. Aside from the Colloquium, it also features a Fair that brings to the campus the highly successful UP Diliman exhibition for the National Science and Technology Week 2012 held last 10-14 July at the SMX Convention Center. The Fair also showcases the activities of some of UP Diliman's R&D partners. While the January *Paliwanagan* was largely concerned with linking members of the UP Diliman research community to each other, the September *Colloquium and Fair* brings into the loop the external stakeholders who are helping to advance R&D initiatives in the campus. Moreover, while the January *Paliwanagan* was mainly intended for researchers and graduate students, the September event is designed to be relevant and interesting to undergraduate students as well.

*Paliwanagan sa UP Diliman* aims to: 1) showcase OVCRD-funded research and creative work programs, projects and initiatives; 2) acquaint UP Diliman constituents with the research and creative work initiatives of their colleagues in other UP Diliman units; 3) discuss available institutional support for UP Diliman researchers and creative workers; and 4) highlight the complete R&D cycle from proposal writing through intellectual property creation, dissemination and utilization. Aside from these objectives, the *Colloquium and Fair* also aims to: 1) acquaint UP Diliman constituents with the University's various R&D partners; and 2) increase undergraduate students' appreciation of R&D's relevance to them personally and to the larger society.

*Paliwanagan's* goals are aptly captured in the event's logo. The spiral of the nautilus shell reminds of a vitality guided by the golden ratio or phi constant, which embodies the ideals of what is dynamic, organic, and harmonious. Rooted to learned lessons, each former spiral serves as basis for the formation of future spirals, reminding that future development is driven and guided by a central vision. Circular endpoints of some light rays in the logo correspond to already realized research and creative work initiatives. Rays without definite endpoints imply a promise of continuous support as intended by *Paliwanagan* and its organizer, the OVCRD.

Logo design: Aleth A. Gayosa  
Graphic arts: Gracezl Mark T. Manuel

# BOOK OF ABSTRACTS

## OVCRD Colloquium and Fair 2012

5 September 2012  
National Institute of Physics  
National Science Complex  
University of the Philippines Diliman



University of the Philippines  
OFFICE OF THE PRESIDENT  
Quezon City



As a community of scholars dedicated to rendering excellent public service and making UP a great university in the 21st century, we strongly encourage a culture of research, innovation and creativity.

As the country's national university, UP is mandated to be at the helm of the Philippines' educational institutions. The creation, dissemination and popularization of relevant research outputs and creative works play an indispensable role in pushing the country forward in the face of age-old problems and emerging challenges. Such academic initiatives sustain, revitalize or propel the nation's growth. They may even inspire critical transformation or fill in gaps resulting in a dramatic improvement in people's lives.

This compilation is an eagerly anticipated contribution to the body of knowledge that generations of thinkers and builders can use. These research works support the University's mission of shaping minds that shape the nation. The University's healthy variety of policies, programs, personnel, facilities and incentives boosts the community's drive to produce and share more research and creative outputs that are "*Tatak UP*".

The fruits of the *Iskolar ng Bayan's* diligence and resourcefulness in rigorous research and development efforts are best enjoyed when the Filipino people themselves partake of the many benefits of the harvest. Hence, we take the extra steps to make sure that the findings presented are adequately understood, disseminated and used for public interest and national development.

Together with the UP community and our research and development partners, we celebrate the publication of these studies.

*Padayon, UP! Onward, UP!*

**ALFREDO E. PASCUAL**  
President



University of the Philippines Diliman  
OFFICE OF THE CHANCELLOR  
Quezon City



University of the Philippines Diliman  
OFFICE OF THE VICE-CHANCELLOR  
FOR RESEARCH AND DEVELOPMENT  
Quezon City



Congratulations to the participants of the OVCRD Colloquium and Fair 2012, and to the organizers for successfully carrying out the OVCRD's second and larger event under the theme *Paliwanagan sa UP Diliman*. The *Paliwanagan* aims to further engage the members of the UP Diliman community in a vibrant exchange of ideas and research, all of which represent the excellent, innovative, and collaborative quality of work coming from the different academic and artistic disciplines of the University. The presentations of the many exciting new projects will impart knowledge that in turn will not only prove useful but also inspirational. Through the Colloquium and Fair, knowledge grows and becomes communal, and our understanding of the world, of societies, and of one another increases along with our capacity for action and public service.

This occasion, then, is an assertion of the scholarly mind's relevance, of the creative mind's worth. This is a celebration of intellectual rigor, diligence, imagination, and cooperative spirit, especially among projects completed through multidisciplinary approaches. Through this event we move forward as a community that upholds academic excellence and serves as the origin of social progress. As always, I hope that the projects and research featured in the Colloquium and Fair will soon be tested and applied beyond our University, and eventually, reach the future generations of scholars who will take up the perennial challenge of searching for and imparting enlightenment. In the meantime, I look forward to learning more about everyone's work and findings,

Again, congratulations to the participants and to the OVCRD for your productive endeavors.

**Prof. CAESAR A. SALOMA, PhD**  
Chancellor  
UP Diliman

Welcome back to *Paliwanagan sa UP Diliman*, the OVCRD Colloquium and Fair 2012. The first *Paliwanagan* Colloquium on 16 January was such a big success that more Diliman researchers and creative workers volunteered now not only to present their research papers but also to exhibit their inventions and creations; hence, the Colloquium *and* Fair today.

We are mindful of the new UP charter that affirms the objective to “serve as a research university in various fields of expertise and specialization by conducting basic and applied research and development, and promoting research in various colleges [...], and contributing to the dissemination and application of knowledge.”

We heed as well the call to “lead as a public service university by providing various forms of community, public, and volunteer service, as well as scholarly and technical assistance to the government, the private sector, and civil society while maintaining [our] standards of excellence.” Indeed, UP's objectives of research and service are intertwined.

Today we have a chance to preview more than 30 projects of research and creative work by UP Diliman faculty, staff and students. We have on display as well the activities of selected UP Diliman research partners. The next round of Colloquium is already anticipated on 21 January 2013, as more researches and creative works are going on.

We thank every participant, presenter and exhibitor at *Paliwanagan* for helping refine, disseminate and apply every new knowledge, knowhow, invention, or creation being presented, for the benefit of society.

*Mabuhay po ang mga researcher at creative worker ng UP Diliman!*

**Prof. BENITO M. PACHECO, PhD**  
Vice-Chancellor for Research and Development  
UP Diliman

# PROGRAM

- 8:00 – 8:30 AM Registration
- 8:30 – 8:35 AM National Anthem
- Opening Remarks  
Prof. Benito M. Pacheco, PhD  
Vice-Chancellor for Research and Development, UP Diliman
- 8:35 – 8:45 AM Message  
Prof. Caesar A. Saloma, PhD  
Chancellor, UP Diliman
- 8:45 – 10:15 AM Session 1: *Mitigating Health and Environmental Hazards*  
Expression, purification and characterization of the *Plasmodium falciparum* merozoite surface protein 1 (MSP1) block 2 variants
- Denise Mirano-Bascos, PhD  
National Institute of Molecular Biology and Biotechnology  
College of Science
- Testing the effectiveness of coral spat seeding as reef restoration tool
- Ronald D. Villanueva, PhD  
Marine Science Institute, College of Science
- Geometric morphometrics, DNA barcoding, genetic diversity, and length-weight relationships of sea catfishes (*Siluriformes: Ariidae*) from Laguna de Bay, Philippines
- Jonas P. Quilang, PhD  
Institute of Biology, College of Science
- Structurally controlled landslides: Recent examples from Guinsaung and Little Kibungan, Philippines
- Sandra G. Catane, PhD & Hillel B. Cabria  
National Institute of Geological Sciences, College of Science
- OPEN FORUM  
Moderator: Lourdes M. Portus, PhD  
Department of Communication Research  
College of Mass Communication
- 10:15 – 10:30 AM Coffee Break / Viewing of EXHIBITS
- 10:30 AM – 12:15 PM Session 2: *Seeking New Perspectives, Pursuing Innovative Ideas*  
The excavation of the old town of San Juan, Batangas
- Grace Barretto-Tesoro, PhD  
Archaeological Studies Program
- Wittgenstein's misunderstood religious thought
- Earl Stanley B. Fronda, PhD  
Department of Philosophy, College of Social Sciences and Philosophy
- Generation of recombinant integrin subunit fusion proteins for biophysical analysis
- Neil Andrew D. Bascos, PhD  
National Institute of Molecular Biology and Biotechnology  
College of Science
- Primal-dual active set methods with central tendencies in the inactive set
- Marrick C. Neri, PhD  
Institute of Mathematics, College of Science
- Multigrid optimization schemes for solving control- and state-constrained elliptic optimal control problems
- Michelle C. Vallejos, PhD  
Institute of Mathematics, College of Science
- OPEN FORUM  
Moderator: Henry J. Ramos, PhD  
OVCRD/National Institute of Physics, College of Science

# FAIR EXHIBITS

## 8AM-5PM, NIP Main Lobby

- 12:15 – 12:30 RAFFLE of UPD publications: 5 sets print publications & 1 set pre-loaded in tablet computer
- 12:30 – 1:15 PM Lunch Break / Viewing of EXHIBITS
- 1:15 – 2:30 PM Session 3: *Delineating the Nuances of Philippine Politics and Governance*  
A cultural biography of overseas contract work: Migration, narration, standpoint
- Odine Maria M. de Guzman, PhD  
Department of English and Comparative Literature  
College of Arts and Letters
- Framing the population debate: A comparison of source and news frames in the Philippines
- Clarissa C. David, PhD  
Graduate Studies Department, College of Mass Communication
- A study on the institutionalization of people's involvement in disaster management by LGUs in two barangays in Metro Manila
- Leticia S. Tojos, PhD  
Research and Extension for Development Office  
College of Social Work and Community Development
- OPEN FORUM  
Moderator: Tina S. Clemente, PhD  
Asian Center
- 2:30 – 2:45 PM Coffee Break / Viewing of EXHIBITS
- 2:45 – 4:30 PM Session 4: *Promoting the Welfare of Children, Youth and Women*  
Detection of *Angiostrongylus cantonensis* and other nematodes in Metro Manila populations of *Achatina fulica* using the SSU rRNA gene
- Ian Kendrick C. Fontanilla, PhD  
Institute of Biology, College of Science
- The development of class management and visualization system for mobile educational games
- Rowel O. Atienza, PhD  
Electrical and Electronics Engineering Institute, College of Engineering
- Y-STR DNA analysis of 154 female child sexual assault cases in the Philippines
- Minerva S. Sagum  
Natural Sciences Research Institute, College of Science
- Communication variables that influence the job retention and attrition of call center agents in Makati and Cebu
- Niel Kenneth F. Jamandre  
Department of Speech Communication and Theatre Arts  
College of Arts and Letters
- Support system of female managers in Philippine quick-service restaurants
- Lilibeth J. Baylosis  
Department of Hotel, Restaurant and Institution Management  
College of Home Economics
- OPEN FORUM  
Moderator: Odine Maria M. de Guzman, PhD  
Department of English and Comparative Literature  
College of Arts and Letters
- 4:30 – 4:45 PM RAFFLE of UPD publications: 5 sets print publications & 1 set pre-loaded in tablet computer
- 4:45 – 5:00 PM Closing Remarks  
Prof. Benito M. Pacheco, PhD  
Vice-Chancellor for Research and Development

### UP DILIMAN CREATIONS AND INVENTIONS

#### The SOUL of the Internet

- Joshua Arvin S. Lat, Kevin Charles V. Atienza & Rod Xavier R. Bondoc  
Department of Computer Science, College of Engineering

#### TracelT: A Catalyst for Learning for Children with Special Needs

- Dana Elisa G. Nicolas, Rosemarie P. Manago & Adrian A. Angeles  
Department of Computer Science, College of Engineering

#### Underwater Pharmaceuticals

- Cynthia P. Saloma, PhD  
National Institute of Molecular Biology and Biotechnology, College of Science

#### Light for Data Storage: Increasing the Fidelity of Holograms

- Percival F. Almoro, PhD  
National Institute of Physics, College of Science

#### A Leap Forward for Science: Learning while Playing

- Rowel O. Atienza, PhD  
Electrical and Electronics Engineering Institute, College of Engineering

#### UP Structural Biology Research: Analyzing Biomolecules through their Structures

- Neil Andrew D. Bascos, PhD  
National Institute of Molecular Biology and Biotechnology, College of Science

#### Landslides, Mudslides, and Avalanches: Capturing Large-scale Events in Table-top Setups

- Christopher P. Monterola, PhD & Jesus Felix Valenzuela, PhD
- Anthony G. Longjas, PhD & Christopher P. Monterola, PhD
- Rene C. Batac, PhD; Marissa G. Pastor, PhD; Johnrob Y. Bantang, PhD & Christopher P. Monterola, PhD
- Johnrob Y. Bantang, PhD; Marissa G. Pastor, PhD; Marko Arciaga, PhD; Rene C. Batac, PhD & Christopher P. Monterola, PhD  
National Institute of Physics, College of Science

#### Wind Generator System: Simpler is Better

- Miguel T. Escoto, Jr., Niño Christopher B. Ramos, Adrian Jay A. Virata & Emmanuel Brian P. Arceo  
Electrical and Electronics Engineering Institute, College of Engineering

#### The Oil-Eating Bacteria

- Cynthia T. Hedreyda, PhD  
National Institute of Molecular Biology and Biotechnology, College of Science

#### The MICROLAB

- Louis P. Alarcon, PhD  
Electrical and Electronics Engineering Institute, College of Engineering

#### There's Fuel in Wastewater Algae

- Wilberto D. Monotilla, PhD, Darryl Joy Juntilla, Alvin Bacero Bello & Rhona Garces Abisado  
National Institute of Molecular Biology and Biotechnology, College of Science

### UP DILIMAN R&D PARTNERS

- Advanced Science and Technology Institute
- Bureau of Agricultural Research
- Industrial Technology Development Institute
- Metals Industry Research and Development Center
- National Research Council of the Philippines
- Philippine Council for Industry, Energy and Emerging Technology Research and Development
- United States Agency for International Development

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## COLLOQUIUM SESSION 1

### *Mitigating Health and Environmental Hazards*

## Expression, Purification and Characterization of the *Plasmodium falciparum* Merozoite Surface Protein1 (MSP1) Block 2 Variants

Denise Mirano-Bascos

Severe malaria is characterized by the presence of one or more of the following symptoms: severe anaemia, kidney failure, pulmonary oedema, mental confusion, acute respiratory distress syndrome as a result of metabolic acidosis, and coma. The cause of almost all cases of severe malaria in humans is the parasite, *Plasmodium falciparum*. Previous studies have shown that there is a correlation between the merozoite surface protein 1 block 2 allele variant of *P. falciparum* and severe malaria. The study hypothesizes that this correlation may be due to the immune response of the host against the protein produced from this gene. To test this hypothesis, the biophysical and antigenic properties of one of the variants, RO33, were cloned, expressed and evaluated. Current results indicate that this protein is highly susceptible to proteolysis and elicits a biased antibody response in mice. Future research will determine the immune response against the other variants, K1 and MAD20.

#### About the Researcher

Dr. Denise Mirano-Bascos is an assistant professor at the National Institute of Molecular Biology and Biotechnology, College of Science, UP Diliman. She obtained her PhD in Molecular and Cellular Biology from Tulane University, Louisiana, USA in 2007. Her current research interests are in T cell biology, specifically the effect of protein structure on epitope immune dominance, and helper T cell-B cell interactions. She is the co-head of the Protein Structure and Immunology Laboratory of the NIMBB-UPD along with her husband, Neil Andrew D. Bascos.

## Testing the Effectiveness of Coral Spat Seeding as Reef Restoration Tool

Ronald D. Villanueva

The worldwide decline of coral reefs due to natural and anthropogenic disturbances necessitates the development of techniques to restore damaged reefs. The potential use of sexually-derived coral propagules as a tool in coral reef restoration is currently being actively investigated. This study was conducted to determine growth and survivorship of juveniles of the reef-building coral *Acropora valida*, outplanted at a degraded reef. These juveniles were products of sexual propagation, i.e., involving coral spawning, gamete fertilization, larval rearing and settlement, and juvenile rearing, at an outdoor hatchery facility. Six-month old juvenile corals attached to rubble inserted into plastic masonry wall plugs ("tox") were outplanted to three experimental bommies at the Bolinao-Anda Reef Complex, northwestern Philippines. Cumulative survival of outplants was  $67.5 \pm 7.6\%$  during a study period of 183-190 days, with no apparent difference among bommies. The juveniles grew with a 37-fold increase in ecological volume – from  $1.25 \pm 0.97 \text{ cm}^3$  ( $1.1 \pm 0.3 \text{ cm}$  mean diameter) at outplantation to  $46.19 \pm 35.49 \text{ cm}^3$  ( $3.8 \pm 1.1 \text{ cm}$  mean diameter) at approx. 6 mo. The results of this study substantiate the use of sexually-derived coral propagules for reef restoration. Cost analysis revealed sexually-produced corals to be more expensive than asexual counterparts. Further developments or refinements in the culture technology for sexually-derived corals for reef restoration are needed to enhance cost-effectiveness.

### About the Researcher

Dr. Ronald D. Villanueva obtained his PhD in Marine Science from the Marine Science Institute (MSI), College of Science, UP Diliman in 2006. He was a post-doctoral fellow in a World Bank-Global Environment Facility funded project on coral reef restoration. He has published at least 10 papers in ISI-indexed journals on the topics coral reproduction and ecotoxicology, coral reef ecology and restoration in the past eight years. He is currently a research associate professor at MSI and the resident scientist and deputy director for the Bolinao Marine Laboratory.

## Geometric Morphometrics, DNA Barcoding, Genetic Diversity, and Length-Weight Relationships of Sea Catfishes (*Siluriformes: Ariidae*) from Laguna de Bay, Philippines

Jonas P. Quilang

The sea catfishes *Arius dispar* and *A. manillensis* are commercially important fishery resources especially in the localities surrounding Laguna de Bay, the largest lake in the Philippines. The two species look very similar externally, but they can be distinguished by examining the tooth patch morphology on the palate. Within each species, however, there are variants of tooth patch morphology. Shape differences between *A. manillensis* and *A. dispar*, between populations and between variants within each species, were determined. Samples were obtained from Binangonan, Tanay and Calamba areas of Laguna de Bay. Shape differences between species, between morphs within species, and among specimens from the three sites were significant, but the groups were difficult to differentiate due to high overlaps in Canonical Variate Analysis (CVA) plots and low Mahalanobis distance-based correct classification percentages. DNA barcoding using the mitochondrial cytochrome c oxidase I (COI) gene sequence was done to determine if the species can be discriminated at the molecular level. Twenty-two sequences were generated: 14 for *A. manillensis* and eight for *A. dispar*. The neighbor-joining tree of the COI sequences using the Kimura 2-parameter model was not able to distinguish between the two species. The mean interspecific distance between these two species was not even higher than the intraspecific distance within each of them. The results obtained from DNA barcoding and geometric morphometrics could be attributed to possible introgression between the two species or to the possibility that *A. dispar* and *A. manillensis* are one and the same species.

Of the two species, *A. manillensis* is endemic to the country. Drastic reduction in population sizes of *A. manillensis* has been recorded in the past, which may have resulted in genetic bottleneck. The genetic diversity of *A. manillensis* was assessed using the mitochondrial DNA control region. Specimens were obtained from three localities along Laguna de Bay, namely, Binangonan (n=27), Tanay (n=29), and Calamba (n=30). Of the 86 DNA sequences generated, 22 distinct haplotypes were observed. The maximum likelihood tree and median-joining network showed little geographic separation among the haplotypes. The overall computed  $F_{ST}$  was 0.0144, indicating small genetic differentiation from the three localities sampled. Total haplotype diversity and nucleotide diversity among the

specimens from the three sites were 0.775 and 0.013, respectively. The high haplotype diversity coupled with low nucleotide diversity observed in this study confirms that genetic bottleneck occurred in *A. manillensis*, which was followed by population expansion. For determining length-weight relationships, a total of 1,698 *A. dispar* (907 males and 791 females) and 874 *A. manillensis* (230 males and 644 females) were collected beginning October 2009 until September 2010. For each of the two species, the regression parameter (b) ranged from 3.1 to 3.3 indicating positive allometric growth.

This study provides baseline information which can be used for the management and conservation of these economically important fishery resources.

#### About the Researcher

Dr. Jonas P. Quilang is an Assistant Professor at the UP Diliman Institute of Biology. He obtained his PhD in Biology from the UP Diliman in 2008. He is currently the head of the Genetics Academic Group and the Deputy Director for Research and Extension of the Institute of Biology. He has authored and co-authored 16 papers in 10 different international journals.

## Structurally-controlled Landslides: Recent Examples from Guinsaugon and Little Kibungan, Philippines

Sandra G. Catane & Hillel B. Cabria

Many recent landslide disasters in the Philippines occurred in geologically unstable areas commonly underlain by rocks transected by faults and joints. On 8 October 2009, at 10:30 pm (LST), Typhoon Parma dumped more than 700 mm of rainfall in a week in northern Luzon, triggering landslides in the mountainous provinces. The most fatal landslide, in Little Kibungan in La Trinidad Benguet Province, swept away 30 houses and killed about 150 people. The landslide occurred on steep slope underlain by weak pyroclastic breccias and sandstones, and traversed by a fault system.

In another site, the Philippine Fault Zone (PFZ) appears to have a major control for landslides in Southern Leyte. It produced the steep slopes (60-90%) along

Mt. Can-abag which has been the site of active landslides. Indeed, a disastrous landslide on 17 February 2006 that buried the entire village of Guinsaugon was initiated along a fault plane associated with the PFZ.

Both regional scale assessment and field engineering geologic mapping conducted on the two recent landslide areas revealed the importance of secondary geologic structures in making the sites susceptible to slope failure. Rapid regional assessment using topographic maps and DEM are in good agreement with field-based evaluation.

#### About the Researchers

Dr. Sandra G. Catane is a Professor in Geology at the National Institute of Geological Sciences (NIGS), UP Diliman. She obtained her PhD degree in Environmental Science in 1994 at the Graduate School of Science and Technology, Kobe University, Japan, where she specialized in geohazards, environmental geology and disaster risk management. As a faculty and researcher, she has published a number of papers in ISI-listed journals as well as international and local journals, and presented many papers in international and local scientific meetings. She served as the Deputy Director for Research and Development at NIGS (2005-2007) and is in the List of Experts on Geoengineering of the Geneva-based Intergovernmental Panel on Climate Change (IPCC). She is the current head of the Engineering Geology Laboratory, NIGS.

Hillel B. Cabria obtained her BS and MS Geology degrees from the National Institute of Geological Sciences (NIGS), UP Diliman. Her MS thesis focused on landslide hazard assessment. Her research area of specialization is slope stability analysis using engineering geological methods. Her co-authored publications have been published in ISI-indexed journals and local newspapers. She is currently a senior geologist at the GEOS Inc., Quezon City.

## COLLOQUIUM SESSION 2

### *Seeking New Perspectives, Pursuing Innovative Ideas*

## The Excavation of the Old Town of San Juan, Batangas

Grace Barretto-Tesoro

This project focuses on the development of the town of San Juan, Batangas. It involves the excavation of stone ruins in the old town and adjacent areas. This project is significant because San Juan is the first Spanish town that is archaeologically investigated. Artefacts recovered from the excavation are inventoried, analyzed, photographed, and curated. Interviews with locals were also conducted to gain insights on the original stone structures. The goal is to understand the nature of these ruins, trace the development of the town, and examine the reasons for destruction.

### About the Researcher

Dr. Grace Barretto-Tesoro is an Associate Professor and currently Deputy Director at the UP-Archaeological Studies Program. She has been conducting archaeological studies in Southern Luzon since 2003.

## Wittgenstein's Misunderstood Religious Thought

Earl Stanley B. Fronda

Ludwig Wittgenstein's religious thought and its derivative, the Wittgensteinian philosophy of religion, are criticised for their alleged unorthodoxy—i.e. they are said to be advocating fideism, or non-realism, or even crypto-atheism. However, these criticisms largely stem from a misunderstanding borne of a difference in discursive culture within Christendom. There is not just a disagreement, but a conceptual dissonance, between, on the one hand, the Wittgenstein and the Wittgensteinians, and on the other hand, their philosophical theist critics. This conceptual dissonance is a residue of the traditional conceptual divide between (if one may put it) the creed-oriented Western Christendom and the apophatic-oriented Eastern Christendom, and of the overlooking of the apophatic thought of (the pre-Thomist) Thomas Aquinas. The critics proceed from the Western Christian discursive culture; yet it so happens that the religious thought of

Wittgenstein (and, after him, D Z Phillips) shares theological affinity with the apophatic tradition, a tradition that the critics seem to have not given sufficient cognizance. Wittgensteinian philosophy of religion, however one dislikes it, is in good theological company within Christendom. If the critics should call Wittgensteinian philosophy of religion “unorthodox” for what it is, then they may as well call the Orthodox faith, Thomas Aquinas, and the Pseudo-Dionysius “unorthodox”.

#### About the Researcher

Dr. Earl Stanley B. Fronda is an Associate Professor at the Department of Philosophy, College of Social Sciences and Philosophy, UP Diliman. He specializes in the philosophy of religion, with special interest in Wittgensteinian philosophy of religion, apophatic theology, and the science-and-religion relationships.

## Generation of Recombinant Integrin Subunit Fusion Proteins for Biophysical Analysis

Neil Andrew D. Bascos

Integrins provide the principal means for cellular attachment to the extracellular matrix (ECM)<sup>1</sup>. Integrins are made up of subunits that associate as heterodimers on the cell surface<sup>2</sup>. The binding of integrin heterodimers to ECM ligands provide attachment to the ECM as well signals for intracellular processes, thereby “integrating” the intracellular and extracellular environments. The formation of different integrin heterodimer combinations results in different affinities for several ligands as well as variations in intercellular processes signaled<sup>1</sup>. Studies have correlated the formation of different integrin heterodimers with the multiple stages of cancer progression<sup>3,4</sup>. The predominance of particular heterodimer pairs can be attributed to the varied interaction sites and binding affinities between the different monomer subunits. Modulation of these traits may serve as a means of controlling the integrin heterodimer populations expressed in a given cell, thereby providing possible applications in cancer therapy. Recombinant protein generation allows the synthesis of these integrin subunits at the millimolar levels required for biophysical analysis.

This study was aimed at generating recombinant integrin subunit proteins for the biophysical analysis of integrin heterodimer formation. Successful

amplification of the desired integrin subunits ( $\alpha 2, \alpha 3, \alpha V, \alpha 1$ , and  $\alpha 3$ ) was followed by insertion of the amplicons into the pPICZ $\alpha$  plasmid and integration into the genome of *P. pastoris* for expression. In addition, plasmids for the expression of the recombinant integrin subunits were generated and transformed into appropriate cultures. The generation of the expression plasmids for the functional domains of the integrin  $\alpha 3$  subunit and the integrin  $\alpha 1$  subunit were confirmed by sequence analysis. The successful transformation of several bacterial and yeast cultures was confirmed through PCR colony screening. The expression and purification of a recombinant integrin beta 1 subunit functional domain were confirmed with Western blot analysis. Conditions for the expression and purification of other integrin subunits are currently being optimized.

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## About the Researcher

Dr. Neil Andrew D. Bascos is an alumnus of the Molecular Biology and Biotechnology Program (1999) of UP Diliman. He completed his graduate studies at Tulane University in New Orleans, where he trained in the use of NMR to study the structural requirements for the function of a molecular chaperone machine. He currently co-heads the Protein Structure and Immunology Laboratory at the National Institute of Molecular Biology and Biotechnology – UP Diliman with his wife, Denise.

# Primal-Dual Active Set Methods with Central Tendencies in the Inactive Set

Marrick C. Neri

Blocky images are better reconstructed using the total variation model designed by Rudin, Osher, and Fatemi (ROF) [4]:

$$\min_u \frac{1}{2} \int_{\Omega} (u - d)^2 + \alpha \int_{\Omega} |\nabla u| dx. \quad (1)$$

This model is especially suitable for removing Gaussian noise. For images with impulse noise or outliers, the more suitable model is the total variation model with L1 fidelity term [1]:

$$\min_u \int_{\Omega} |u - d| + \alpha \int_{\Omega} |\nabla u| dx. \quad (2)$$

Recent approaches to solve regularized versions of these variation models employ the primal-dual active set (PDAS) approach (see [2, 3]). In this paper, we consider reconstructing noisy blocky images using modified heuristic versions of PDAS methods. We propose to assign statistical central measures as pixel values in inactive sets, or sets of pixels of low contrast, of the decomposed imaged domain. Specifically, the mean is the assigned value for the L2 ROF model-based PDAS method, and the median for the L1 model-based PDAS method. These approaches lead to new heuristic methods that incorporate the robustness of the PDAS approach and the potential cost-reducing scheme of the central measure assignment. Some nice features of the heuristic approach are: lessened computational cost due to fewer PDEs to solve, edge sharpness, and better

restoration of at image features. These observations are verified by numerical results. The proposed methods, however, only work for non-texture image reconstructions.

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## About the Researcher

Dr. Marrick C. Neri is an Assistant Professor at the Institute of Mathematics, UP Diliman (IM-UPD). His fields of research are in optimization and image processing. He has made contributions in denoising and in painting algorithms, as well as in decomposition approaches and metaheuristics in optimization. At present, Dr. Neri serves as deputy director for facilities and resources at IM-UPD.

# Multigrid optimization schemes for solving control- and state-constrained elliptic optimal control problems

Michelle C. Vallejos

Multigrid schemes that solve control- and state-constrained elliptic optimal control problems discretized by finite differences are presented. A comparison is made between two multigrid methods, the collective smoothing multigrid (CSMG) and the multigrid for optimization (MGOPT) methods. To illustrate both techniques, we focus on minimization problems governed by elliptic partial differential equations.

## About the Researcher

Dr. Michelle C. Vallejos is doing research on the numerical solution of optimal control problems. In particular, she is working on the development of multigrid methods for solving optimization problems governed by elliptic partial differential equations. These problems arise in many important application fields like fluid dynamics, shape optimization and mathematical imaging. She obtained her PhD degree from Austria and has continued doing research on multigrid methods through the research projects funded by the OVCRD.

## COLLOQUIUM SESSION 3

### *Delineating the Nuances of Philippine Politics and Governance*

## A Cultural Biography of Overseas Contract Work: Migration, Narration, Standpoint

Odine Maria M. de Guzman

This paper traces the life trajectory of an overseas Filipino worker to examine the ways by which her direct experience of migration has not only set her political route but has also set her apart from the usual politician because of a particular standpoint. This standpoint, which I propose to be called an OFW standpoint, lends her entry into the political mainstream its transformative potential.

Taking off from the notion of the “everyday world as problematic” (Smith 1987) and using narrative and discourse analysis, I aim to read particular instances in the biographical narrative of a former OFW, Connie Bragas Regalado, to examine how these particular recorded instances in her everyday life could have forged a certain perspective, a standpoint. Reading the biographical narratives of Connie and the conditions of the social and work experiences of other women migrant domestic workers against the official account and policies on labor migration can reveal the process(es) under which Connie matured in her political work and under which conditions migrant domestic workers’ activism remain, and/or discontinue to be, committed. Additionally, such an alternative angle of vision — that which produces a certain standpoint, an OFW standpoint, in this case — reveals the “realities” that may have been obscured in the vision of traditional politicians who craft the laws that impact on OFW lives.

This textual reading of a life is an attempt to make sense of an individual experience of labor migration in the context of the wider labor export program of the Philippines and contract labor flows in the Asian region. It illustrates the ways by which the country’s labor migration policies have influenced the life course of a migrant worker: it plots the itinerary of a migrant worker, greatly influenced by government policies, and in the course of things, matured to become a political activist. This reading is also an attempt at capturing what C. Wright Mills had eloquently described as the “sociological imagination,” the intersection of public issues and personal problems, of biography and history.

The study of individual, personal lives is part and parcel of history. Usually, biography is undertaken to have a critical understanding of the nation’s great heroes and leaders. That biography has concentrated on the lives of the “great” people is not only the case but these “great” people had predominantly been men, too.

The study of lives from a feminist perspective challenges many of the received assumptions of biography. It redirects attention to the study of women's everyday lives and underscores the fact that they live exceptional lives worthy of academic and literary attention.

This study takes on the feminist biographical perspective of *auto/biography*, an analytic tool, "concerned with epistemological matters: with issues and claims surrounding what is seen to be knowledge; and consequently [it illuminates the study of] 'lives' as a means of bringing into focus the relationship between individuals and social structure" (Stanley 2000). From this purview, the study of lives from the standpoint of the non-dominant offers the potential of "creating more inclusive, more human conception of social reality" (Personal Narratives Group 1989).

#### About the Researcher

Dr. Odine Maria M. de Guzman is an Associate Professor at the Department of English and Comparative Literature, UP Diliman. She is the editor of *From Saudi with Love: 100 Poems by OFWs* (UPD OVCRD, 2003) and *Body Politics: Essays on Cultural Representations of Women's Bodies* (UPCWS, 2002). Among her recent publications are chapters in: *The Family in Flux in Southeast Asia: Institution, Ideology, Practice* (Kyoto University Press and Silkworm Books, 2012), *Traveling-Nation Makers: Transnational Flows and Movements in the Making of Modern Southeast Asia* (Kyoto University Press and National University of Singapore Press, 2011), *Migration and Gender in Globalized Asia* (Hanul Academy, Seoul, 2011, translated to Korean). Her research interests include women's auto/biographical writing, Philippine feminist and gender studies, and OFW culture and discourse.

## Framing the Population Debate: A Comparison of Source and News Frames in the Philippines

Clarissa C. David (*Project Leader*), Jenna Mae A. Atun & Antonio GM La Vina

This study compares frames constructed by two sides of the Philippine population management debate with media frames of the issue. Analysis was conducted through neural network analysis with the CatPac computer program. On the one hand, supporters of the policy use a 'development frame' which defines population as a problem borne out of people having large families; it is argued that unchecked population growth negatively impacts on development outcomes such as education and income. In the development frame, the proposed solution is to institute a population management policy that promotes family planning (contraceptive use) to help Filipinos achieve their desired family size. Opponents, on the other hand, use two frames, one which equates the policies with abortion, and another which argues that such policies will lead to a degradation of moral values. Results delineate the competing frames from both sides and show that the media frame reflects both views, but that the discourse is presented as conflict.

#### About the Researchers

Dr. Clarissa C. David is an Assistant Professor at the College of Mass Communication's Graduate Studies Department where she teaches research methods, public opinion, political communication, and communication theory. Her areas of research specialization include political communication, news framing, effects of news on political knowledge, and public opinion polling. She completed her PhD in Communication at the University of Pennsylvania and her research has appeared in a number of journals including the *Journal of Communication* and the *International Journal of Public Opinion Research*.

Jenna Mae A. Atun is a Master's degree candidate at the UP School of Economics and teaches communication at the Ateneo de Manila University Communication Arts Department. She was awarded the best undergraduate thesis by the Communication Research Department and graduated magna cum laude from UP College of Mass Communication.

Antonio GM La Vina is an environmental lawyer and currently Dean of the Ateneo School of Governance. He earned his JD from Yale University and served as Undersecretary for the Department of Environment and Natural Resources. In addition to environmental law, he also teaches Constitutional Law at UP and is constantly engaged in human rights and environmental activism.

## **A Study on the Institutionalization of People's Involvement in Disaster Management by LGUs in Two Barangays in Metro Manila**

**Leticia S. Tojos**

This study sought to find out if people's involvement in disaster risk reduction and management (DRRM) has been institutionalized in the governance process in Santolan, Pasig and Tumana, Marikina. The areas explored were: the strategies used by local officials to elicit involvement; the structures and mechanisms set up; the nature and extent, as well as the strengths and limitations, of residents' participation in DRRM. The results aim to enhance the understanding of LGU officials about the many facets of sustaining the residents' active involvement in DRRM.

Participation of the residents had been viewed from the perspective of empowerment, wherein people are seen to be actively engaged in decision making and, together with elected officials, are visible in the structures set up to respond to and mitigate the effects of disasters in their own localities.

Results showed that, in practice, leadership in disaster programs and projects was mainly hierarchical and not shared. City executives conceptualized and disseminated legislations and programs/projects to the barangay officials for compliance who, in turn, involved the community as their workforce in the implementation of the said decisions. Participation of the residents was elicited mainly during actual disasters which is reflective of its reactive, one-shot and assistive nature.

Considering the centralized practice of governance in the two localities, it is important to note the two divergent viewpoints regarding the scope and level of community participation in DRRM. The prevailing perspective recognized the residents' support role in information dissemination, rescue operations and distribution of relief goods; maintenance of cleanliness and order in the evacuation

centers; and in the rehabilitation of their communities during disasters. The other standpoint, espoused mainly by some key informants belonging to the LGU, NGOs and people's organizations and a significant number of residents, called for the community's active engagement in DRRM. Their representation in DRRM structures and processes should be visible. Their opinions and suggestions ought to be considered as well.

To strengthen and institutionalize the involvement of residents in DRRM, these recommendations were presented: 1) DRRM should be addressed from a holistic perspective. This means that local officials should address the other prevailing issues affecting the locality together with endeavors to make their communities safe and secure; 2) in institutionalizing the participation of the residents in the management of disaster related activities, their contribution should be visible from the barangay down to its smallest unit, the household; and 3) similar researches may be undertaken in the future to test out the models using the multivariate logistic regression with a bigger, randomly selected sample size.

### **About the Researcher**

Dr. Leticia S. Tojos is a University Extension Specialist at the Research and Extension for Development Office of the College of Social Work and Community Development (REDO-CSWCD). She is also a member of the College Disaster Risk Reduction and Management (DRRM) Cluster.

## COLLOQUIUM SESSION 4

### *Promoting the Welfare of Children, Youth and Women*

## Detection of *Angiostrongylus cantonensis* and Other Nematodes in Metro Manila Populations of *Achatina fulica* Using the SSU rRNA Gene

Ian Kendrick C. Fontanilla

The rat lungworm, *Angiostrongylus cantonensis*, is a parasitic nematode of murid rodents, which can also infect humans and cause eosinophilic meningitis. Though not natural definitive hosts of the parasite, humans get accidentally infected by consumption or handling of infected intermediate hosts such as the Giant African Snail *Achatina fulica*. In this study, *A. fulica* individuals were sampled from twelve areas in Metro Manila to check for the presence of the nematode using the molecular marker SSU rRNA gene. Of the 365 snails, 61 were infected with nematodes. The SSU rRNA gene sequences of 226 nematodes were matched to eight distinct taxa, two of which were matched to named taxa: *Angiostrongylus cantonensis* and the dog hookworm *Ancylostomacanthum*. Majority of the nematodes examined (61.5%) were found to be *Angiostrongylus cantonensis*, although most were concentrated in just one area (Fairview, QC). On the other hand, *Ancylostomacanthum* was found in the most number of areas (4 out of 12). This is also the first time *A. caninum* was detected in *Achatina fulica*. The results of this study are a cause of concern for public health as both parasites could accidentally infect humans. Preliminary results from other parts of the Philippines are also presented.

#### About the Researcher

Dr. Ian Kendrick C. Fontanilla obtained his PhD at the University of Nottingham where he worked on the Giant African Snail, *Achatina fulica*, particularly its evolutionary history and its nematode parasites. He has been with the UP Diliman Institute of Biology since 1997 where he is also currently the Deputy Director for Academic Affairs.

# Development of Class Management and Visualization System for Mobile Education Games

Rowel O. Atienza

By incorporating educational games and other applications into the traditional classroom, technology-enhanced learning environments offer an alternative way of teaching that encourages students to learn new lessons in an engaging and enjoyable manner. And just as the traditional classroom needs a teacher to guide students to learning, the technology-enhanced learning environment also requires a teacher who will play a similar function but in a different learning setup. However, school teachers are less likely to adopt a new learning system if they find it confusing and difficult to manage.

Thus, the project team developed a software tool that enables teachers to supervise a technology-enhanced learning environment. The learning environment described in this project is composed of the teacher device and several student devices connected over a wireless network. Emphasis was put on the design of a user interface that is easy to use for teachers who are the expected end-users of this software tool.

## About the Researcher

Dr. Rowel O. Atienza is an Associate Professor at the Electrical and Electronics Engineering Institute of UP Diliman's College of Engineering. He obtained his PhD degree from the Australian National University in 2008, MEng degree from the National University of Singapore in 1997, and BS Electrical Engineering degree from UP Diliman in 1993. His research areas of interest include human-machine interfaces, mobile computing, and information technology (IT) for education.

# Y-STR DNA Analysis of 154 Female Child Sexual Assault Cases in the Philippines

Sheena Marie B. Maiquilla, Jazelyn M. Salvador, Gayvelline C. Calacal, Minerva S. Sagum (*Presenting Author*), Miriam Ruth M. Dalet, Frederick C. Delfin, Kristina A. Tabbada, Shiela Ann Edith L. Franco, Henry B. Perdigon, Bernadette J. Madrid, Merle P. Tan & Maria Corazon A. de Ungria

There is a need to include DNA evidence as part of the routine litigation of sexual assault cases in the Philippines in order to accelerate the identification of the real perpetrators of abuse of child-victims and to prevent wrongful conviction of innocent persons. We evaluated the use of Y-STR DNA analysis in 154 child sexual assault cases referred by four Child Protection Units (CPUs) in the Philippines. These cases involved female child victims with age range from 2 to 18 years who had sought medical attention within 72 hours after the incident. In 130 cases, the child victims knew the alleged offenders and identified them during the interview with the social worker. There were reports of penile ejaculation in 68 child victims with varying reports of washing after contact. A total of 84 children admitted having wiped their genitalia prior to the collection of biological samples for DNA testing.

CPU Laboratory personnel examined vaginal smears in only 109 cases using a light microscope and reported 23 samples to be positive for sperm cells. Male DNA was detected in vaginal swab samples from 63 child victims using the PowerPlex® short tandem repeat of the Y chromosome (Y-STR) DNA multiplex system. We observed positive amplification at 11 Y-STR DNA markers consistent with a single male DNA profile in 39 cases. Twenty-eight of these full single Y-STR DNA profiles were found to be unique when searched in worldwide Y-STR DNA population databases (~40,000 haplotypes), eight haplotypes matching Filipinos and/or Asian haplotypes and one Y-STR DNA profile only matching European, Caucasian, and Latin American haplotypes.

## About the Researchers

The presenting author, Minerva S. Sagum, is a University Research Associate 1 at the DNA Analysis Laboratory of the Natural Sciences Research Institute, UP Diliman. She finished her BS Chemistry degree at Far Eastern University Manila and her Certificate Program for Secondary Education at the Assumption College Makati. She has co-authored papers on the use of forensic DNA technology published in local and international refereed journals. She has more than 20

papers presented in local and international symposia and conferences. She is involved in such projects as the Philippine Innocence Project, which assists the wrongfully convicted to seek justice through the use of DNA technology, and the DNA Prokids Philippines, a humanitarian initiative to use DNA in combating human trafficking.

Jazelyn M. Salvador, Gayvelline C. Calacal, Minerva S. Sagum, Miriam Ruth M. Dalet, Frederick C. Delfin and Maria Corazon A. de Ungria are affiliated with the DNA Analysis Laboratory, Natural Sciences Research Institute, Miranda Hall, UP Diliman.

Bernadette J. Madrid and Merle P. Tan are affiliated with the University of the Philippines Manila Child Protection Unit, Philippine General Hospital, and the Department of Pediatrics, College of Medicine, University of the Philippines Manila.

Sheena Marie B. Maiquilla, Kristina A. Tabbada, Shiela Ann Edith L. Franco and Henry B. Perdigon were formerly connected with University of the Philippines Natural Sciences Research Institute - DNA Analysis Laboratory.

## **Communication Variables that Influence the Job Retention and Attrition of Call Center Agents in Makati and Cebu**

**Niel Kenneth F. Jamandre**

The Philippines is the leading Business Process Outsourcing (BPO) destination in Asia, according to the IBM Latest Global Locations Trend Annual Report. Call centers comprise 70 percent of the BPO operations. In the last quarter of 2010, the total number of Filipinos working in call centers was around 350,000 compared to 330,000 in India. BPO operations are mostly in Metro Manila, Makati, Ortigas, Alabang, and Quezon City. As Manila-based call centers experience talent saturation, companies have expanded operations in key cities and provinces in the Philippines.

This research analyzes communication factors that influence Filipino call center agents or Customer Service Representatives (CSRs) to stay in a company. It also aims to compare the job retention factors of CSRs who work in Metro Manila with those in Region 6. The study uses the Organizational Assimilation

Theory by Fred Jablin as the theoretical framework, and the methods used to gather data were survey and focus group discussion. Interview data were then analyzed qualitatively. Survey data on communication variables were subjected to Factor Analysis, and comparisons across groups were assessed using t-test and ANOVA.

Findings show that there are significant relationships among the CSRs' intention to stay in the company and their communication skills, customer relationship, work environment, relationship with peers, and length of stay. CSRs in Region 6 also appear to have a higher probability of staying in a company compared to those who work in Metro Manila.

### **About the Researcher**

Niel Kenneth F. Jamandre is an Assistant Professor of the Department of Speech Communication and Theater Arts, College of Arts and Letters, UP Diliman. His areas of specialization are organizational communication, intercultural communication, and mediated communication. His research interest is on the Business Process Outsourcing industry.

## **Support System of Female Managers in Philippine Quick Service Restaurants: A Follow-up Study**

**Lilibeth J. Baylosis (*Project Leader*) & Jennifer T. Bunagan**

This study aimed to validate and build upon the result of Baylosis' pilot study on the support system available to female managers in Philippine Quick Service Restaurants (QSR) and their perceived work/life balance. Thus, this study's hypotheses were formulated based on the findings of the pilot study.

In the Philippines, women and men have equal opportunity to education, and this has enabled the former to steadily outnumber the latter in occupying executive positions over the last five years (China Staff, 2007). It is estimated that 97 percent of the businesses in the Philippines have women in senior management positions (Brion in China Staff, 2007; Philippine Daily Inquirer, 2007).

Greenhaus and Beutel (1985) found that the multiple roles that individual employees assume (family, work, professional, recreational, church, club community) often create conflicting demands and expectations. Nonetheless, employees can perform well when they can share their problems and joys with others (Bower, 2009; Luthans, 1998; Susskind, 2007). If such support is lacking, the situation could be stressful and this could result in some health care costs (Luthans, 1998).

It is within this context that this study on the support system for female managers in quick service restaurants was undertaken. The study utilized the Competing Values Framework by Quinn and Rohrbaugh (1983) which has two dimensions of focus to achieve effectiveness: a) internal and external forces and b) flexibility and control. The internal forces include the support system from immediate family, friends, and paid house help of the female managers while the external forces include technology, the company, the superior and the subordinates. The research methodology included the conduct of surveys and in-depth interview of female managers from eighty four stores of the pioneer of the Asian-quick service restaurant.

In general, the respondents' claim that they gain support from both internal and external systems confirms the hypothesis that the female managers view their work life as balanced contrary to the findings of the Baylousis' pilot study in 2008.

#### **About the Researchers**

Assistant Professor Lilibeth J. Baylousis (UP BS HRA 1984 ,UP MBA 2002) is a full-time faculty of the Department of Hotel, Restaurant and Institution Management, College of Home Economics, UP Diliman. She was an exchange Professor for one year at Woosong University, South Korea. Her 27 years of food service work experience include managing a homegrown QSR here and overseas.

Jennifer T. Bunagan teaches quantity food production, nutrition in foodservice, cost control and culinary math at the Department of Culinary Nutrition Science, Woosong University, South Korea. She was a Senior Lecturer and Tearoom Supervisor of the College of Home Economics, University of the Philippines.

## **FEATURED CREATIONS & INVENTIONS**

### **UP Diliman Exhibition for the National Science & Technology Week 2012**

# The SOUL of the Internet

Joshua Arvin S. Lat, Kevin Charles V. Atienza & Rod Xavier R. Bondoc

The SOUL System: Secure Online USB Login System makes user authentication to websites more secure by adding another requirement to the login and registration processes. Instead of having only a password to login, the user now needs both a password and a security token to login to a website. The security token is an ordinary hardware device such as smart phones, laptops, and USB flash drives that allow storage for photos and other files. There is no need to install any additional software in order to login to the user's accounts. The SOUL System SDK, which is available for Java, Python, and PHP, makes the integration of the SOUL System to any website very easy, fast, and flexible.

What makes the SOUL System much better than other authentication systems is that if any hacker manages to obtain the user's password but not the contents of the security token (or vice-versa), the hacker will still not be able to access the user's account. Obtaining both password and security token is difficult because of the complex hybrid cryptosystem that SOUL System's inventors have developed. SOUL System is thus designed as a secure, low-cost, portable and flexible two-factor authentication system.

The brainchild of three undergraduate UP Diliman Computer Science students, the SOUL System received the top prize in both the Kaspersky Asia Pacific & MEA Cup 2012 (Hong Kong) and Kaspersky International Cup 2012 (Netherlands) hosted by the leading internet security company, Kaspersky Labs.

## About the Researchers

Joshua Arvin S. Lat (Project Leader) is an experienced Software Engineer / Web Developer at Deal Grocer. He recently graduated Magna Cum Laude from UP Diliman. He represented the team in both the Kaspersky Asia Pacific & MEA Cup 2012 and Kaspersky International Cup 2012.

Rod Xavier R. Bondoc is a Software Engineer at Lobang Club. A Cum Laude graduate of UP Diliman, his areas of expertise include web development and server administration.

Kevin Charles V. Atienza is a Software Engineer / Web Developer who graduated Summa Cum Laude from UP Diliman. His areas of expertise include web development and algorithms.

# TraceIT: A Catalyst for Learning for Children with Special Needs

Dana Elisa G. Nicolas, Rosemarie P. Manago & Adrian A. Angeles

TraceIT is a computer-assisted instruction program developed to support children with special education needs (SEN) in improving their writing skills. A Computer-Assisted Instruction (CAI) program, TraceIT is an educational game that requires students to follow the correct strokes in writing the lowercase alphabet. In the process, the program also helps the students enhance their gross motor skills.

TraceIT teaches special education students to write in basic form and be able to write in, as much as possible, a precise manner. It also develops their phonetic awareness, letter formation and letter recognition through visuals and animation (tutorial) and auditory output of letter names. Using Kinect™ technology, a student uses his/her hand and arm to trace in mid-air the letter shown on the screen. TraceIT allows the student to have a profile of his/her own in order to keep track of his/her progress and skill levels. As a means of measuring student progress, a timer is used in the background as the game runs; guidelines are observed to determine student's accuracy in writing.

This student project bagged the second prize in Microsoft Philippines' Imagine Cup 2012 Competition, Local Finals, Software Design Category. In addition, this project was accepted for presentation at the 4<sup>th</sup> International Conference on Applied Human Factors and Ergonomics 2012 (AHFE 2012) in California, USA.

## About the Researchers

Dana Elisa G. Nicolas is currently a graduating student of the Department of Computer Science at UP Diliman. She is currently working as a web developer for the CloudTop Project of the Department of Science and Technology and the Department of Education. She also engages in free lance software development while finishing her undergraduate program at the University.

Rosemarie P. Manago graduated with a degree in Computer Science from UP Diliman. She is currently working freelance for software development projects.

Adrian A. Angeles is a faculty member of the Department of Computer Science of UP Diliman's College of Engineering.

# Underwater Pharmaceuticals

Cynthia P. Saloma

The toxoglossate superfamily of venomous snails is composed of the *Conidae*, *Terebridae* and *Turridae* families. The family *Turridae* is the most abundant in terms of species richness, comprising more than 90% of the biodiversity of all venomous snails. Turrids use a cocktail of short, neuroactive peptides in their venom to stun their prey or to protect themselves from possible predators. They use their spearlike teeth, called the radula, to capture their prey. Researchers from the National Institute of Molecular Biology and Biotechnology (NIMBB) in UP Diliman together with collaborators from the Marine Science Institute (MSI), study the venom duct of these snails to isolate their toxin genes. The scientific framework of hunting for novel toxin genes is by identifying mRNA transcript sequences from the turrid venom ducts, either by cDNA library screening or by transcriptome sequencing. The venom duct transcriptome is a collection of mRNAs produced by this organ, and it holds the key for identifying and isolating various genes coding for neuroactive peptides that could be potential drugs to soothe pain, cure epilepsy, calm tremors or manage hyperactive behavior. Turrids, therefore, could be an important source of bioactive drugs that could be harnessed from the natural bounty of Philippine marine life.

So far, NIMBB and MSI researchers under the PharmaSeas Drug Discovery Program, which received generous support from PCAMMRD-DOST, have identified numerous novel putative toxin genes from sea snails. The researchers take advantage of the observation that neuroactive peptides from venomous marine snails follow specific cysteine patterns and precursor regions. They are now busy cloning and expressing candidate genes to test the activity of the peptides they encode in model organisms.

## About the Researcher

Professor Cynthia P. Saloma, PhD is the Director of the National Institute of Molecular Biology and Biotechnology in UP Diliman and concurrently the Principal Investigator and Head of the Laboratory of Molecular and Cell Biology in the same Institute. Dr. Saloma is also the Program Director for the Philippine Genome Center's (PGC) DNA Sequencing Core Facility (DSCF) of the UP System, and the outgoing President of Outstanding Young Scientists' Inc. of the Philippine Academy of Young Scientists, National Academy of Science and Technology Philippines. She pursued her PhD in Physiology at Osaka University. Her research interests are developmental biology and neurology.

# Light for Data Storage: Increasing the Fidelity of Holograms

Percival F. Almero

Holography is an optical method for storing and reconstructing data such as object waves. To record a hologram on film or digital camera sensor, an object wave is combined with a reference wave. Reconstructing the object wave is then carried out by illuminating the hologram in a specific way, producing a diffracted wave that is an exact replica of the original object wave.

Holograms can also be used in the optical inspection of sub-surface defects for material testing. Scientists at the National Institute of Physics (NIP) of UP Diliman have developed a fringe processing technique that makes it easier to characterize even minute sample defects [Catalan and Almero, 2012].

Traditional holography involves the use of a reference wave that makes the traditional methods sensitive to vibrations resulting in phase errors. NIP scientists, in cooperation with international research partners, have developed a novel reconstruction method called deterministic speckle phase retrieval [Almero, et al., 2012]. The method does not use a reference wave, making the setup simpler and robust against disturbances.

## Publications

- [1] Catalan F.C.I., Maallo A.M.S. and P.F. Almero, "Fringe analysis and enhanced characterization of sub-surface defects using fringe-shifted shearograms," Optics Communications, (*in press*, 2012)
- [2] P. F. Almero, L. Waller, M. Agour, et al., "Enhanced deterministic phase retrieval using a partially developed speckle field," Optics Letters 37 (11), 2088-2090 (2012)

## About the Researcher

Dr. Percival F. Almero is an Associate Professor at the National Institute of Physics (NIP) in UP Diliman and the Program Coordinator of the NIP's Photonics Research Group. He obtained his PhD in Physics in 2004 from the University of the Philippines and has authored and co-authored 21 papers that were published in different ISI journals and presented in several International Conference Proceedings. Physics, optics, lasers, holography, speckles, interferometry, phase retrieval, coherent metrology are among his research interests.

# A Leap Forward for Science: Learning while Playing

Rowel O. Atienza

Students today are growing up with a natural affinity for video games as well as an open acceptance for new gadgets and technology. This has prompted the LEAP (Learning while Playing) Project to launch researches aimed at creating synergy between technology, education and gaming. Composed of undergraduate students, software programmers, education specialists, graphic artists and musicians, the LEAP Project aims to develop a framework based on pedagogical learning theories to be integrated into technological media for students to utilize.

Within this framework, the team is developing educational games on various Science topics. The learning objectives of each game are patterned after the Department of Education's Grade 6 Science curriculum. Currently, 12 games have been designed, namely:

- 1) Eatsy Bugsy, a game on food webs and food chains;
- 2) Hungry Wolves, a game on balance in the ecosystem;
- 3) Star Invaders, a game about star color and temperature;
- 4) StarGram, a game with interesting facts and trivia on the 88 constellations;
- 5) TapStop Pollution, a game addressing issues of pollution;
- 6) Earthquake City, a game that teaches what to do before, during, and after an earthquake;
- 7) Raft Mania, a game which demonstrates Newton's Third Law of Motion;
- 8) Ecosystem Game, a game that features 15 priority areas of the World Wildlife Fund;
- 9) Messenger Quest, a game that shows the different kinds of forces;
- 10) Layers of the Earth, a game that familiarizes students with the earth's geographic layers;
- 11) Layers of the Atmosphere, a game that explores the different layers of the atmosphere; and
- 12) Simple Machines, a game which illustrates the use of simple machines to navigate a given area.

The LEAP Project tests the effectiveness of the framework by having an interactive learning system implemented in a classroom setting. A group of IT experts, primary and secondary school teachers and students evaluate the

efficacy of each game in the framework in terms of learning and understanding Science concepts.

## About the Researcher

Dr. Rowel O. Atienza is an Associate Professor at the Electrical and Electronics Engineering Institute of UP Diliman's College of Engineering. He obtained his PhD degree from the Australian National University in 2008, MEng degree from the National University of Singapore in 1997, and BS Electrical Engineering degree from UP Diliman in 1993. His research areas of interest include human-machine interfaces, mobile computing, and information technology (IT) for education.

# UP Structural Biology Research: Analyzing Biomolecules through their Structures

Neil Andrew D. Bascos

Structural Biology Research can help determine characteristics of molecules that may prove to have relevance for our country's industrial and economic needs. Structural Biology Research at the UP Diliman has led to reveal the structure of the first Philippine Fluorescent Protein.

Fluorescent proteins absorb electromagnetic energy and release it as light. Organisms use them to absorb UV rays and use the resulting glow to lure prey, to communicate, and to attract potential mates. Scientists have found uses for fluorescent proteins in monitoring protein interactions and processing, as well as tracking cell locations and movement.

Although extremely useful, fluorescent proteins have defined conditions for use. Therefore, research to identify novel fluorescent proteins continues. Of particular interest are fluorescent proteins that can survive extreme environments like high heat, high acidity or high alkalinity.

A collaborative team of researchers at UP are working on the development of a fluorescent protein from a Philippine soft coral. This novel fluorescent protein shows qualities that rival commercially available varieties. In addition, it has

interesting traits such as thermostability (>85pC); limited acid and alkaline resistance; and resilience to protease degradation. The molecular structure of this protein has been determined in collaboration with the Taiwan National Synchrotron Radiation Research Center. Research continues on the details of the protein's interactions with itself and other molecules.

#### **About the Researcher**

Dr. Neil Andrew D. Bascos is an alumnus of the Molecular Biology and Biotechnology Program (1999) of UP Diliman. He completed his graduate studies at Tulane University in New Orleans, where he trained in the use of NMR to study the structural requirements for the function of a molecular chaperone machine. He currently co-heads the Protein Structure and Immunology Laboratory at the National Institute of Molecular Biology and Biotechnology – UP Diliman with his wife, Denise.

## **Landslides, Mudslides, and Avalanches: Capturing Large-scale Events in Table-top Setups**

**Christopher P. Monterola, Rene C. Batac, Anthony G. Longias, Marko Arciaga,  
Jesus Felix Valenzuela, Marissa G. Pastor, & Johnrob Y. Bantang**

Landslides, debris flows, and avalanches among others are examples of processes in which our understanding of the dynamics is quite limited because the physics associated with granular matter is still unresolved. Describing granular material is still a challenge owing to the fact that the collective behavior of an ensemble of numerous solid grains does not obey any known hydrodynamic equations. Taking on this challenge, a team of researchers in the Complex Systems Group of UP Diliman's Instrumentation Physics Laboratory have developed scaling principles that allow the statistics of large-scale events to be replicated in table-top setups.

The primary thrust of the project is to develop mechanism-based theoretical framework for probing the fundamental dynamics of polydisperse granular matter. The project team utilizes different analytical and numerical procedures and performs extensive experiments to assess, among others, the stability of mixtures, particle-fluid interaction, clogging of mixed disks, and landslide

dynamics. The ideas generated in this project provide new perspectives in clogging, segregation, aggregation or mixing of granular material. These ideas are envisioned to translate to better methods for prediction of calamities like landslides and avalanches.

The study of granular matter also has important implications for the industry. Granular matter, after water, is the second most manipulated material in the industry. It is estimated that more than half of the loss in the industry is due to inefficient handling of granular matter. The project, therefore, also endeavors to provide information that would lead to better handling of industrial products.

Six (6) papers based on this work were published in high-impact international journals.

#### **About the Researchers**

Christopher P. Monterola, PhD was an Associate Professor in Physics of the National Institute of Physics (NIP). He is now a Senior Scientist and Principal Investigator, Complex Systems Programme, Computing Science Department, Institute of High Performance Computing, A\*STAR in Singapore.

Johnrob Y. Bantang, PhD (JB); Anthony Longjas, PhD (AL); Marissa G. Pastor, PhD (MP); and Jesus Felix Valenzuela, PhD (JFV) are Assistant Professors in Physics of NIP. They are members (part of the staff) of the Instrumentation Physics Laboratory and compose the senior members of the Complex Systems Group in the same lab, currently coordinated by JB. JB is currently assigned as the director of the University Computer Center of UP Diliman. AL is the current coordinator for the GE subject Physics 10: Physics and Astronomy for the Pedestrians in UP Diliman. MP is currently the coordinator of the undergraduate Advanced Physics Laboratory. AL and MP are scheduled for their postdoc stint in the United States and Korea, respectively.

## **Wind Generator System: Simpler Is Better**

**Miguel T. Escoto, Jr., Niño Christopher B. Ramos, Adrian Jay A. Virata, &  
Emmanuel Brian P. Arceo**

Wind power, harnessed through wind turbines, is one of the most environment-friendly solutions to the world's ever-growing demand for electricity. The challenge is to make the technology not only more efficient but also more accessible to communities.

The project “Permanent Magnet Generator Modeling for Wind Power Prediction” focuses on simplifying the model of the basic building blocks of the wind turbine system while maintaining its ability to predict wind generator’s power outputs with accuracy. The theoretical framework uses the electromagnetic model of an axial-flux permanent magnet generator, which estimates the output for various magnet and coil configurations. The project is intended to be used mainly for generator sizing and power output estimation.

Unlike similar technologies that require sophisticated software and techniques such as the finite element method, the Permanent Magnet Generator (PMG) developed by engineers in UP Diliman provides a simpler way of estimating power outputs by using basic circuit elements. It is wind power technology that is easily understood and managed by ordinary people.

### About the Researchers

Miguel T. Escoto Jr. received his M.S. EE degree from Worcester Polytechnic Institute in 1982. He is currently a faculty member at the Electrical and Electronics Engineering Institute in UP Diliman. His research areas include power electronics, electric motor drives, solar photovoltaics and wind energy systems.

Niño Christopher B. Ramos is currently taking up M.S. EE in UP Diliman. He is currently involved in the renewable energy field in the UP Power Electronics Laboratory. He is the supervising science research specialist in the UP-DOST Wind Power Generator System Project.

Adrian Jay Virata received his B.S. ECE degree from UP Diliman and graduated Magna cum Laude. His research includes wind turbine emulator system modelling. He was the Electrical Engineering Team Leader in the 2012 Shell Eco-Marathon Competition.

Emmanuel Brian Arceo received his B.S. ECE degree from UP Diliman. His research includes Vienna Rectifier Design and Phase-locked loops. He is also a member of the UP Shell Team which participated in the 2012 Shell Eco-Marathon Competition.

## The Oil-Eating Bacteria

Cynthia T. Hedreyda

Bioremediation is the process of using microorganisms, like bacteria and fungi to remove or break down unwanted substances such environmental pollutants. Scientists at UP Diliman’s Molecular Microbiology Laboratory (MML) are harnessing this technique to find solutions to bunker oil spills. Oil pollution usually destroys everything in its path. However, MML scientists have found that some hardy bacteria are able to survive in bunker oil-contaminated environments and even thrive in such locations. The scientists are isolating these oil-degrading microorganisms to be able to pinpoint the actual genes involved in oil degradation.

So far, the MML has identified various species of bacteria that can naturally degrade and disperse bunker oil. Among them are *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Paenibacillus thiaminolyticus*, *Bordetella bronchiseptica* and *Lysinibacillus sphaericus*. These bacteria contain genes that encode oil degradation relevant enzymes such as alkane hydroxylases, cytochrome P450, and catechol dioxygenase. The MML’s ultimate goal is to isolate the enzyme-encoding genes implicated in breaking down bunker oil and see if they can act alone or in tandem when inserted into non-degrading bacteria such as *Escherichia coli*. Identifying said genes could pave the way for producing designer microbes that can efficiently degrade oil contaminants.

### About the Researcher

Professor Cynthia T. Hedreyda earned her PhD in Microbiology from the University of Georgia and is the Principal Investigator of the Molecular Microbiology Laboratory (MML) of the National Institute of Molecular Biology & Biotechnology (NIMBB), UP Diliman. MML has completed several research projects that have resulted in ISI publications co-authored by undergraduate and graduate students who obtained their training from the laboratory. Dr. Hedreyda is a Fellow of the Philippine Academy of Microbiology and has received, among others, the Outstanding Microbiologist Award from the Philippine Society of Microbiology, Inc and the Dr. Eusebio Garcia Award in Molecular Biology and Pathology from the NRCP in 2005, UP Scientist in 2006, the Achievement Award in Biological Sciences from NRCP in 2008, and the Outstanding Alumni Award from UPAA in 2010.

# The MICROLAB

Louis P. Alarcon

At the helm of UP Diliman's initiatives towards improving electricity distribution and management is the Microelectronics and Microprocessors Laboratory (MICROLAB). Specifically, the Laboratory is developing integrated sensor nodes capable of perpetual operation via energy harvesting. Formed in 1989, the Laboratory focuses on the design and implementation of new digital, analog/RF and mixed-signal integrated circuit technologies, as well as the conceptualization of new applications based on these technologies.

## About the Researcher

Dr. Louis P. Alarcon is an Assistant Professor at the Electrical and Electronics Engineering Institute in UP Diliman. He pursued a PhD in Electrical Engineering and Computer Science at the University of California, Berkeley. His research interests include Microelectronics, Integrated Circuits, RFICs, and Low-Power Processor Design.

# There's Fuel in Wastewater Algae

**Wilberto D. Monotilla (Project Leader), Darryl Joy Juntilla, Alvin Bacero Bello & Rhona Garces Abisado**

Concerns about energy security and protection of the environment have led to research about biofuels. At the Aquatic Biotechnology Laboratory (ABL), scientists and researchers are developing a technology that will produce biofuel from wastewater algae. ABL now has seven micro-algal stocks isolated from the wastewaters of the UP Diliman campus. Among the collections are species from the algae genera of *Chlorella*, *Scenedesmus*, and *Aphanocete*. The most promising of the stocks is *Chlorella sorokiniana*, which has been found to be more efficient than oil crops as alternative source for biofuel production because they reproduce relatively faster and have higher lipid content.

Lipids are biomolecules that may be converted to biofuel. Preliminary research results indicate that under specific growth conditions, such as lowered nitrogen concentration, the *Chlorella* microalgae produces more lipids than it normally does. What still needs to be done is improve the growth conditions of the *Chlorella* species so that it is able to meet the lipid production standards of biofuel production.

The ABL was established in 2009 and is one of the research laboratories at the National Institute of Molecular Biology and Biotechnology in UP Diliman. It pioneers research primarily in freshwater microalgae especially in its genomics, taxonomy and physiology, biodiversity and biotechnology aspects. Microalgae research can lead to new biotech innovations in aquaculture, environmental management, bio-fuels, food production and pharmaceuticals. The research could also contribute to the development of rural and indigenous communities, increased efficiency in industrial sector and improved product development.

## About the Researchers

Dr. Wilberto D. Monotilla is a BS Fisheries graduate of the University of the Philippines Visayas and worked with the aquaculture industry for 10 years. In 1998, he pursued graduate studies at Tokyo University of Marine Science and Technology, where he obtained his MS and PhD in Aquatic Bio-sciences, major in Applied Phycology and Biotechnology under the Japanese Government Scholarship Program. His research background is in aquaculture systems, algal biotechnology and systematics. He is currently the principal investigator of the Aquatic Biotechnology Laboratory, National Institute of Molecular Biology & Biotechnology (ABL-NIMBB), UP Diliman. His current research projects include molecular identification of potential oil-producing micro-algae and differential gene expression of nitrate reductase gene (nR genes) responsible for fatty acid accumulation in these photosynthetic micro-organisms, and micropropagation and cryopreservation of Philippine eucaumatoid species.

Darryl Joy Juntilla received her BS (magna cum laude) & MS degrees in Molecular Biology & Biotechnology from UP Diliman. She is currently a University Research Associate at the ABL-NIMBB.

Alvin Bacero Bello is a freshman taking his Masters Degree in Molecular Biology and Biotechnology at UP Diliman and also working as a research associate at the ABL-NIMBB. Currently, he is working on the Technology Development for the Micropropagation and Cryopreservation of Philippine Eucaumatoids (Red Seaweed).

Rhona Garces Abisado is a BS Agricultural Chemistry graduate of the University of the Philippines Los Banos. Currently, she is working as a research associate at the ABL-NIMBB on the technology development for the micropropagation and cryopreservation of Philippine eucaumatoid species.

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