UB-UZ AIDS International Training and Research Program (AITRP)

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UB Partnership with University of Zimbabwe and Chinhoyi University of Technology Establishes

Zimbabwe International Nanotechnology Center

With 14 percent of Zimbabwe's population living with HIV/AIDS and tuberculosis as a co-infection, the need for new drugs and new formulations of available treatments is crucial. To address these issues, The UB-UZ AIDS International Training and Research Program (AITRP) has led an initiative with two of the University at Buffalo's leading research centers, the Institute for Lasers, Photonics and Biophotonics (ILPB), and the New York State Center of Excellence in Bioinformatics and Life Sciences to launch the Zimbabwe International Nanotechnology Center (ZINC) -- a national nanotechnology research program -- with the University of Zimbabwe (UZ) and the Chinhoyi University of Technology.

This collaborative program will initially focus on research in nanomedicine and biosensors at UZ and energy at Chinhoyi University. ZINC has grown out of the NIH Fogarty International Center's, AITRP that was awarded to UB and UZ in 2008 to conduct HIV research training and build research capacity in Zimbabwe and neighboring countries in southern Africa.

UB faculty and research directors in the ZINC partnership include **Paras N. Prasad, PhD**, SUNY Distinguished Professor of Chemistry, Physics, Medicine and Electrical Engineering, the Samuel P. Capen Chair, executive director of ILPB; **Gene D. Morse, PharmD**, Professor of Pharmacy Practice, associate director of the New York State Center of Excellence in Bioinformatics and Life Sciences and director of the Translational Pharmacy Research Core; **Alexander N. Cartwright, PhD**, UB vice president for research and economic development and interim executive director of the New York State Center of Excellence in Bioinformatics and Life Sciences , who will work with **Professor Levi Nyagura**, UZ vice chancellor; **Professor David T. Simbi,** Chinhoyi vice chancellor, and **Dr. Charles Maponga, PharmD**, UZ pharmacy school director.

ZINC will establish a long-term international research and training platform in the field of nanotechnology, focused in areas that promote Zimbabwe's strength, and advance the development of nanotechnology as an avenue for Zimbabwe's commercial growth. The UB ILPB and TPRC collaboration recognized that the fields of pharmacology and therapeutics have increasingly developed links with emerging areas within the field of nanosciences in an attempt to develop tissue/organ targeted strategies that will lead to disease treatment and eradication. Research teams will focus on emerging technologies, initially focused in nanobiotechnology and nanomedicine for health care.

"Developing nanoformulations for HIV and tuberculosis diagnostics and therapeutics, as well as new tuberculosis drug development, are just a few of the innovative strategies to address these co-infections that this research collaboration can provide," said Morse. "In addition, the development of new nanotechnology-related products will jumpstart the economy and foster new economic initiatives in Zimbabwe that will yield additional private-public partnerships." Morse says that the current plans for a "Center of Excellence" in clinical and translational pharma-

Dr Maponga to form National Nanotechnology Coordination Committee in Zimbabwe

Dr Charles Chiedza Maponga, Co-Director UB-UZ AITRP, has been appointed to the position of Technical Director for Nanotechnology in the Zimbabwe Ministry of Science and Technology Development (MSTD) where his responsibilities will be to spearhead the National Nanotechnology program.

Dr Maponga's responsibilities include the formation of a National Nanotechnology Coordination Committee, which would:

- Supervise and control the research, development and utilization of nanomaterial and nanotechnology
- Register and maintain a list of all institutions and individuals who engage in research, development and utilization of nanomaterial and nanotechnology within Zimbabwe
- Promote and support education and foster research into the development and utilization of nanomaterial and nanotechnology
- Report in an advisory capacity to the MSTD all issues regarding nanomaterial & nanotechnology.

"Developing nanoformulations for HIV and tuberculosis diagnostics and therapeutics, as well as new tuberculosis drug development, are just a few of the innovative strategies...that this research collaboration can provide."
Dr. Gene Morse

Zimbabwe International Nanotechnology Center

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cology in Harare at UZ will create a central hub in Africa, not just for Zimbabwe but for other countries to gain new training and capacity building in many exciting aspects of nanotechnology as well. Morse adds that this initiative creates an opportunity for additional involvement from a number of UB centers such as those represented by UB's Strategic Strengths in areas such as Health and Wellness across the Lifespan, Integrated Nanostructured Systems, Molecular Recognition in Biological Systems and Bioinformatics and Information and Computing Technology.

"With an international program like ZINC, we are hoping to attract pharmaceutical companies and biotechnology firms who will have similar interests in joining this unique partnership that will enhance the likelihood of economic success through efficient, innovative research." "Locally, these efforts will be linked to the growing Buffalo Niagara Medical Campus resulting in a truly global partnership with one anchor in Buffalo -- a comprehensive 'UB matrix' of innovation and excellence," says Morse.

Dr. Admire Dube, UB-UZ AITRP Mentor and Fellow, checks a sample for his research project, "Multimodal nanoparticles for Tuberculosis Chemotherapy." See related stories on pages 10-11.

UB-UZ AITRP Scientific Advisory Board (SAB) Expands

The UB-UZ AITRP Scientific Advisory Board includes a number of internationally recognized leaders in their field. The purpose of the board is to bring together members of academia and industry with various scientific experiences and knowledge to inform the projects of the fellows and the specific aims of the UB-UZ AITRP.

The SAB is chaired by **Robert T. Schooley**, MD, UCSD. SAB Members include:

Stephen Becker, MD, Bill & Melinda Gates Foundation

Richard J Bertz, PhD, Bristol-Myers Squibb R&D

Mark Bruns, PhD, Waters Corporation

Alexander N. Cartwright, PhD, University at Buffalo, SUNY

Stephen Dewhurst, PhD, University of Rochester, SUNY

Giovanni Di Perri, MD, University of Turin

James G Hakim, MD, University of Zimbabwe

Michael C. Keefer, MD, University of Rochester, SUNY

Charles Chiedza Maponga, PharmD, University of Zimbabwe

Veronica Miller, PhD, University of California, Berkeley

Timothy F. Murphy, MD, University at Buffalo, SUNY

Robert L. Murphy, MD, Northwestern University

William Powderly, MD, University College of Dublin

Mary Reid, PhD, Roswell Park Cancer Institute

David H. Ripin, PhD, Clinton Foundation HIV/AIDS Initiative

Ian Sanne, MD, University of the Witwatersrand

Joseph P. Vacca, Merck Research Labs (retired)

UB-UZ AITRP Participates in UZ MEPI:

Dr. Morse Chairs Training Advisory Committee

Dr. Gene Morse traveled to Zimbabwe to participate in the Faculty Development, Annual Strategic Planning and Training Advisory Committee (TAC) and Executive Committee (EC) Workshops held through the Medical Education Partnership Initiative (MEPI) at the University of Zimbabwe (UZ) in Harare, Zimbabwe on March 19-23, 2012.

Dr Morse served as the chair of the TAC for the UZ College of Health Sciences MEPI award, which includes three programs: Novel Education Clinical Trainees and Researchers Program (NECTAR); Cerebrovascular Heath Failure, Rheumatic Heart Disease Interventions Strategy (CHRIS); and Improving Mental Health Education and Research in Zimbabwe (IMHERZ). The goal of these three awards is to improve and expand medical training and research capacity development in Zimbabwe to address the health needs of the national population.

In addition to Dr Morse, the TAC members include: **Arthur L. Reingold**, MD, University of California, Berkeley; **Ana Mocumbi**, MD, PhD, University Eduardo Mondlane, Maputo, Mozambique; **Christopher Chetsanga**, PhD, University of Zimbabwe.

International Pharmacology Specialty Lab Moves to New Building

The Harare International Pharmacology Speciality Laboratory (HIPSL), which is a component of the NIAID AIDS Clinical Trials Group (ACTG) Laboratory Network, recently moved into the Medicines Control Authority of Zimbabwe (MCAZ) building. This move has proved to be a potential for positive interaction with the drug regulating body. The MCAZ has a mandate of ensuring that medicines availed to the public are safe and efficacious. While the MCAZ is mainly involved with in-vitro drug product analysis, HIPSL is developing the capacity to assay biological samples of various drugs. The close proximity of MCAZ to HIPSL makes it a prime environment to partner and facilitate public health priorities.

The MCAZ also has a strong emphasis on post-marketing surveillance of medicines and this dove-tails well with the HIPSL's goals of conducting research protocols that seek to identify pharmacokinetic and pharmacodynamic effects of medicines on the market. HIPSL's thrust on complementary and alternative medicines will be supportive to MCAZ's regulation function. The combined expertise from MCAZ and HIPSL will accelerate improved provision of safe and efficacious medicines to patients. The HIPSL is also a NIAID Clinical Pharmacology Quality Assurance and Quality Control Program (CPQA) designated laboratory.

HIPSL will be a key component for the development of the Zimbabwe International Nanotechnology Centre (ZINC). With Dr Maponga at the helm of this development, it promises to provide innovations in HIV, Tuberculosis (TB) and cancer management. The nanotechnology research programme will see the Institute for Lasers, Photonics and Biophotonics (ILPB) and the New York State Center of Excellence in Bioinformatics and Life Sciences collaborate with the University of Zimbabwe (UZ) and Chinhoyi University of Technology (CUT). The advent of nanotechnology improves the prospects of developing new drug formulations aimed at eradication of diseases like HIV, TB, malaria, and malignancies.

The close proximity of MCAZ to HIPSL makes it a prime environment to partner and facilitate public health priorities.

Dr. Gene Morse and Dr. Chiedza Maponga, UB-UZ AITRP Co-Directors, meeting with AITRP Fellows and staff in the new laboratory.

"Our research fellows can now enjoy the benefits of receiving dual site mentoring which is at the core of our AITRP's HIV Clinical Pharmacology research capacity building plan."

Dr. Chiedza Maponga
Co-Director UB-UZ AITRP

UZ Virtual Lecture Hall Hosts Fellows' Research Forum

The University of Zimbabwe officially opened its new video conferencing lecture hall on June 29, 2012. In addition to its primary role in UZ academics, the hall now hosts the UB-UZ AITRP Fellows' Research Forum. This monthly forum, first held June 8th, provides the opportunity for fellows to present their research projects at various stages, and receive feedback from mentors and from other fellows.

Dr. Chiedza Maponga, co-director of the UB-UZ AITRP, noted that the UB-UZ AITRP is appreciative of the support being made available through the CARA/Econet VLH and that "Our research fellows can now enjoy the benefits of receiving dual site mentoring which is at the core of our AITRP's HIV Clinical Pharmacology research capacity building plan."

The theater hall accommodates up to 200 students, and is equipped with state-of-the-art voice and video– over internet protocol (VoIP) supported by a dedicated two megabit link.

US Embassy in Harare Features UB-UZ AITRP, Highlights International Collaborations and Fellows' Research

A recent networking opportunity for the UB-UZ AITRP at the UZ Research and Intellectual Expo has resulted in the UB-UZ AITRP being featured by the US Embassy in Harare http://harare.usembassy.gov/nanotechnology.html. Mr. Sizani Weza, media specialist with the US Embassy's Public Affairs Section in Harare, and an intern from the National University of Science & Technology (NUST) interviewed Dr. Chiedza Maponga, and UB-UZ AITRP fellows Mr. Dexter Chagwena, Ms. Tsitsi Monera-Penduka, and Mr. Tinashe Mudzviti. The UB-UZ AITRP team conveyed the many successes of the UB- program.

Dr. Maponga provided a detailed background of the International Pharmacotherapy Education and Research Initiative (IPERI) and its relationship to the UB-UZ AITRP. IPERI provides a mechanism for collaborations between UB, UZ and numerous universities and investigators around the world.

One of IPERI's many goals is to provide support and guidance to develop research capacity and infrastructure through collaborative programs such as our UB-UZ AITRP. This collaborative program supports the development of research capacity and infrastructure to conduct research on practical and affordable pharmacotherapy interventions in the management of HIV/AIDS in local populations.

Mr. Weza was intrigued by Dexter's research interests in Nutrition Science and the link between Pharmacy and Nutrition. Dexter explained that the first and foremost important component of any medication was "food" and that his research bridges the gap between Nutrition and Pharmacy.

Tsitsi, a PhD candidate at UZ, highlighted her laboratory portfolio, including her role in the development of the Harare International Pharmacology Specialty Laboratory (HIPSL) and how the HIPSL will work with UB-UZ AITRP fellows who have research studies that require drug assays.

Tinashe noted that he was the first fellow to visit the University at Buffalo for training, and discussed how the UB-UZ AITRP has assisted in the development of his research career. He noted that the development of his clinic portfolio has also played an important role in the development of his research career. Tinashe emphasized that the UB-UZ AITRP collaboration has provided the much needed mentorship and support that was required for him to complete his graduate studies.

The interview is featured on the US Embassy Harare website, and additional interviews are expected. This was such a tremendous achievement for the UZ folks as it puts the research efforts of the UB-UZ AITRP fellows in the spotlight.

"I will never agree that economics can come between a patient's life and death."

Dr. Charles Chiedza Maponga
Co-Director UB-UZ AITRP

UB-UZ AITRP Fellows help develop Traditional Medicines Certificate Program at UZ School of Pharmacy

Research work by AITRP fellows regarding Traditional Medicines produced results that led them to develop a certificate training programme for Traditional Health Practitioners who are involved in prescribing herbal remedies for HIV patients. The aim of this certificate programme is to rationalise the prescribing habits for Traditional Health Practitioners and to be able to control this practice as it has a major influence on the clinical outcomes of HIV patients on Allopathic medication such as antiretroviral drugs.

The course is offered in the School of Pharmacy at the University of Zimbabwe. Traditional Health Practitioners are taught modules relating to Law and Ethics, Business Management, Sustainable Development, and other modules that are important to improving their practice.

The course is 6 months long and it offers both theory and practical exposure. "We emphasize to the Traditional Medical Practitioners the importance of making referrals to tertiary health care centers as their practice is considered on the primary health care level. It is a fact that most patients use traditional medicines either in form of herbs, herbal remedies or the so popular nutritional supplements. So to turn a blind eye to this practice does not help our nation in any way," said Mr. Dexter Chagwena, UB-UZ AITRP Fellow.

The programme has managed to train 60 practitioners who are waiting to graduate.

"It is a fact that most patients use traditional medicines either in form of herbs, herbal remedies or the so popular nutritional supplements. So to turn a blind eye to this practice does not help our nation in any way."

Dexter Chagwena
UB-UZ AITRP Fellow

Traditional herbal remedies processed and packaged.

"Currently we are in the process of registering students for the second intake which is starting on the 15th of October. We are so excited about the response and support from the Ministry of Health and Child Welfare and the public concerning this programme. We have had lectures from the Deputy Minister of Health, Dr Mombeshora the head of Chiefs, Chief Charumbira and other Professors from various departments at this University. One of the most interesting modules is on Intellectual Property Rights where we are teaching the Practitioners to patent and protect their innovative ideas. This is part of the Indigenous knowledge systems that is currently being promoted by the Ministry of Science and Technology."

Mr. Chagwena continued, "I think our combined efforts on Indigenous knowledge systems, nanotechnology and HIV research can get us to eradicate HIV in the next decade."

New Collaboration with Institute of Psychiatry at King's College London

Dr. Gene Morse was invited to present, '"New Eras in HIV Treatment and Capacity Building: Transferring HIV Adherence-Pharmacology Research Model to Zimbabwe" at the Institute of Psychiatry at King's College London (KCL) through The Maudsley Training Programme on June 13, 2012 in London, England.

The presentation highlights the University of Zimbabwe (UZ) collaboration with KCL's Institute of Psychiatry and the University at Buffalo to develop training and research programs that will provide the region with capacity building efforts to increase the number of health professionals who can contribute to the chronic management of HIV/AIDS patients receiving antiretrovirals.

UB, UZ and KCL are currently working on a collaborative proposal for a novel patient care model for the Opportunistic Infections Clinic at Parirenyatwa General Hospital and the University of Zimbabwe.

UB-UZ AITRP Supports UB's Global Health Initiative

"The setting is starving in terms of qualified personnel, thus for me it's a call to serve my community, and the UB-UZ collaboration has given us exposure, skills and resources that we can apply in our setting in improving the delivery system."

Marvelous Sibanda
UB-UZ AITRP Fellow

UB-UZ AITRP Fellows Selected as Panelists for UB's 2nd Annual Global Health Day

UB-UZ AITRP Fellows Mr. Dexter Chagwena and Mr. Marvelous Sibanda were invited to participate as panel members at the UB Second Annual Global Health Day held on March 30, 2012 in Farber Hall. The participants shared their experience from international work and discussed challenges faced in resource limited countries as they relate to public health interventions. This event was organized by the UB Global Health Initiative Club, and was sponsored by UB's Office of Global Health Initiatives and the School of Public Health and Health Professions, Departments of Community Health & Health Behavior and Social & Preventative Medicine. The keynote address was given by Eric Mintz, MD, MPH from the Centers for Disease Control, Atlanta and the program included faculty speakers and a student panel.

Dexter discussed his experience in international research as an AITRP fellow focused on infectious diseases. "This was a great experience, sharing my research and training international experience at such a platform. The most interesting part was the idea of sitting among Public Health Practitioners and linking up my clinical research work to Public Health from a Global perspective. At the end of the day we were speaking the same language."

"At the end of the day we were speaking the same language."

Dexter Chagwena
UB-UZ AITRP Fellow

In response to questions about the differences between the healthcare systems in Zimbabwe and the United States, Marvelous responded by noting that the health system in the US is more privatized as most citizens have health insurance, whereas in Zimbabwe the public sector takes care of the health needs of the majority while only a few have insurance. Marvelous explained that the Zimbabwe public health institutions face a burden of meeting the needs of a large population, thus straining the minimal available resources. When asked why he would return to the challenges of working in a resource limited setting, Marvelous said, "The setting is starving in terms of qualified personnel, thus for me it's a call to serve my community, and the UB-UZ collaboration has given us exposure, skills and resources that we can apply in our setting in improving the delivery system."

Fellows to Lecture at UB Freshman Discovery Seminar Series: Global Health & the HIV Epidemic

UB-UZ AITRP Fellows will, once again, be guest lecturers at the upcoming UB Freshman Discovery Seminar Series , offered at UB during the Spring 2013 semester. The fellows will talk about their research, and

The series utilizes expert guest lecturers in a variety of related scientific fields and provides students unique learning experiences. Students gain insight into health care, its disparities within the world and how it takes effect in communities economically, socially and politically and also learn about the HIV epidemic and issues regarding medication access, research distribution, and cultural discrepancies.

IPERI Presented at UB Graduate Seminar Series

Dr. Gene Morse was invited to present on the International Pharmacotherapy Education and Research Initiative (IPERI) at the UB Department of Social and Preventive Medicine Graduate Seminar Series on March 2, 2012 in Farber Hall.

The slides and audio for this presentation, as well as other presentations from the Seminar Series, can be accessed at
http://sphhp.buffalo.edu/spm/assets/docs/seminars/seminars_2012_spring_recordings.php.

UB-UZ AITRP Fellow Dexter Chagwena Travels to Washington, DC for Clinton Global Initiative Conference

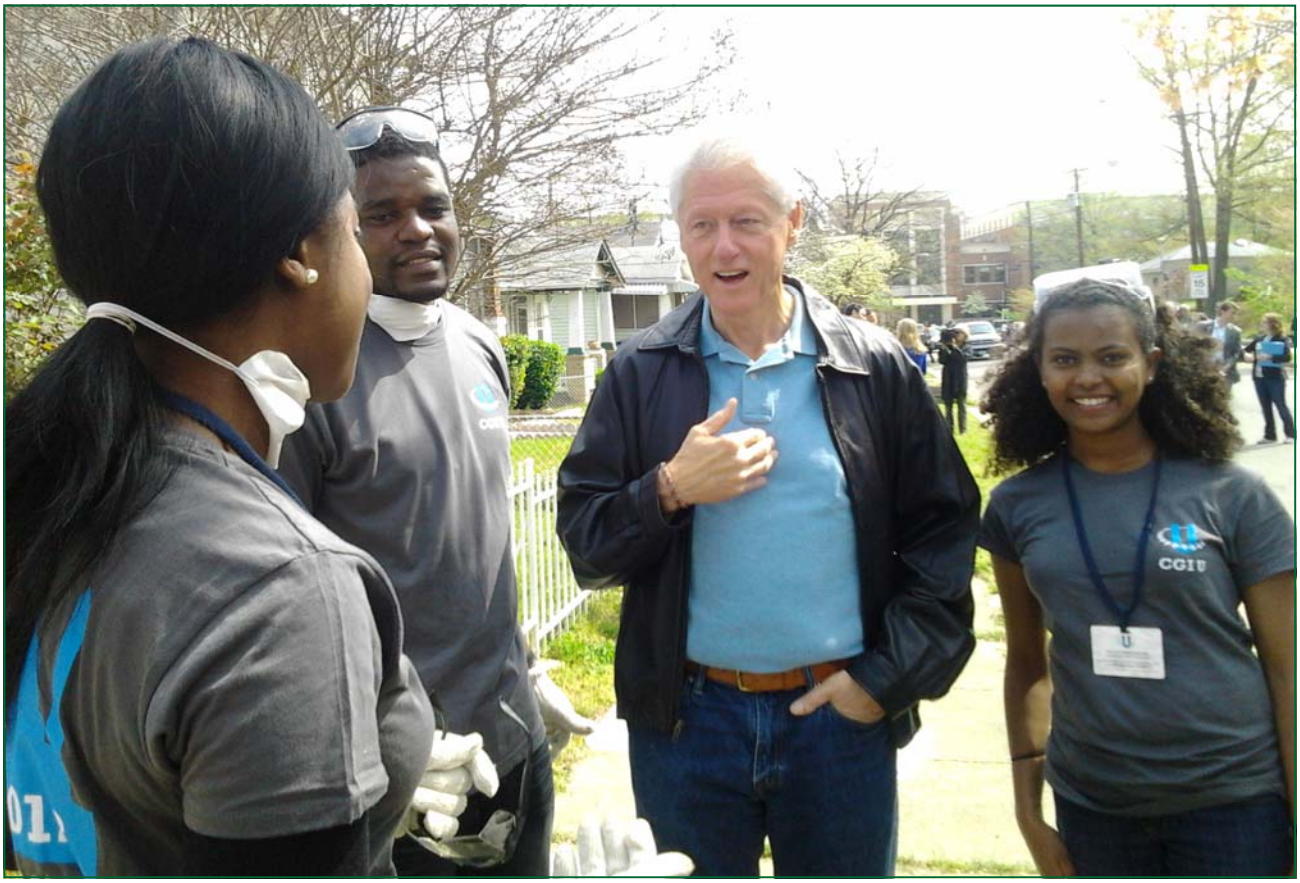
UB-UZ AITRP Fellow Dexter Chagwena traveled to Washington DC, where he represented the University of Zimbabwe at the Clinton Global Initiative-Universities. There, he presented a Public Health Commitment to Action project being implemented at Parirenyatwa Hospital in Harare, Zimbabwe.

"It has been my dream to become that scientist who is able to transform scientific research work into community programs that benefit the society at large. The CGI-U experience opened my eyes on how we, as young scientists can bring positive impact to our communities by just implementing simple and effective projects. By just having a little chat with the former US president William Jefferson Clinton during the Service Project in one of the communities in Washington, I could realize there were a lot of amazing things I could do in my community to change lives, immediately I became eager to come back home and put my experience into action." This is an IPERI project that involves life skills training projects aimed at alleviating poverty among PLWHA attending the PARI support group.

"The AITRP fellowship has helped me to develop skills both in clinical research and community nutrition work as it is my responsibility to deal with all nutrition related issues in the group."

Dexter Chagwena
UB-UZ AITRP Fellow

Dexter has collaborated with others from different fields to implement these projects including Mr. Martin Zende, a tropical resource ecologist, and Ms. Fine Gavaza-Mazambara, a social worker. The projects focus on poverty alleviation, psychosocial support and health promotion among HIV-infected patients in Zimbabwe, and includes a Nutrition Education programme that Dexter is leading. "The AITRP fellowship has helped me to develop skills both in clinical research and community nutrition work as it is my responsibility to deal with all nutrition related issues in the group."



Dexter Chagwena, 2nd from left, and fellow CGIU fellows with former US President Bill Clinton

Ms. Tsitsi Hamandawana

Ms. Tsitsi Hamandawana arrived at University at Buffalo in August 2012 for her initial University at Buffalo (UB) -University of Zimbabwe (UZ) AIDS International Training and Research Program (AITRP) research period. She holds a Bachelor of Pharmacy degree from UZ and is currently working toward her MPhil at UZ.

Tsitsi's research project is on the effect of nutrition status on the adverse drug reaction profiles of antiretroviral and anti-tuberculosis drugs in HIV -1 infected pediatric patients.

During this initial visit to UB, Tsitsi will receive mentored training in a variety of key areas, including research ethics and human subjects protections, principles of clinical pharmacology research, statistical methods, research resources and literature review strategies, and scientific writing.

Ms. Tariro Sithole

Ms. Tariro Sithole arrived at University at Buffalo in August 2012 for her initial UB-UZ AITRP research period. She holds a Bachelor of Pharmacy degree from UZ and is currently earning her MPhil while working at the national regulatory agency in Zimbabwe.

Her UZ MPhil project is titled, "Nanoparticle delivery systems for enhanced bioavailability of the antimalarial compound artemether" at UZ. In support of her MPhil, Tariro's UB-UZ AITRP project will involve nanoconstructs for CNS delivery of rifampicin and artemether.

Mr. Mqondisi Tshabalala

Mr. Mqondisi Tshabalala, a DPhil candidate at UZ's Immunology Department who completed his initial UB visit in 2011, is continuing his research project titled, "HLA gene polymorphism on Subtype C HIV-1 disease progression and viral diversity among ART naïve individuals." The general aims of the project are to predict the rate of disease progression on HLA class I genetics and to correlate ART response with HLA class I genotypes among the above mentioned cohort. The project's specific aims are to use HLA class I genotype to predict the rate disease progression prior to treatment; to determine the effect of HLA class I SNPs on treatment response (changes in viral load and T cell profiles) as well as to determine the HLA class I derived viral diversity in pretreatment era.

UB-UZ AITRP Fellow Presents at FIP 2012

UB-UZ AITRP Fellow Tsitsi Monera-Penduka, a DPhil candidate at UZ, has had three abstracts accepted at the International Pharmaceutical Federation (FIP) World Centennial Congress of Pharmacy and Pharmaceutical Sciences in Amsterdam, Netherlands.

Monera TG, Thebe M. Knowledge, attitudes and perceptions of pharmacists in Zimbabwe on their role in the prevention and management of non-communicable diseases. Accepted for poster presentation.

Monera TG, Tapfumanei P. Lifestyle Interventions for Cancer Health Promotion: Assessing Attitudes, Perceptions and Awareness Among Community Pharmacist in Harare. Accepted for poster presentation.

Monera TG, Gwekwe N. Herbal medicine use in dysmenorrhea: determining extent of use and the commonly used herbs. Accepted for poster presentation.

Mr. Samuel Gavi

Mr. Samuel Gavi, who completed his UB training visits in 2010 and 2011 in the application of biomedical informatics in pharmacology research, continues to apply his training to improve the lives of Zimbabweans. Samuel has used his training experience to initiate collaborative activities within UB and UZ, as well as other universities, including King's College London, with the aim of maximizing Health Information Technology utilization in HIV research and care.

As a result of Samuel's efforts, UZ is now working with the Parirenyatwa Hospital Opportunistic Infections clinic toward the purpose of creating a working group that develops Health Information Technology (HIT) solutions specific to HIV management at the clinic. Samuel's research proposal to develop index tools that measure adherence and medication complexities in patients is awaiting approval by ethical review boards in Zimbabwe.

Samuel has also been able to incorporate Informatics training into the Bachelor of Pharmacy honours curricula as part of the clinical pharmacology course. In July, he and his team completed a study titled, "Assessment of Electronic Health Record (EHR) Use and Adoption by Pharmacists in Harare," aimed at understanding the meaningful use of EHR by pharmacies in Harare. The project was a first step to develop ideas on how use of EHRs can be improved, and their use will result in improved health outcomes.

As part of an ARRA supplement to the UB-UZ AITRP, Samuel contributed to a Health Information Technology online training module designed specifically for HIV research and management. The module is available at: https://tdm.pharm.buffalo.edu/aitrp/index.php?option=com_content&view=article&id=92&Itemid=94

Mr. Dexter Chagwena

Mr. Dexter Chagwena, who completed his first visit to UB in May, has developed his research project on the influence of nutrition on HIV clinical pharmacology among HIV and TB infected children receiving antiretroviral drugs. His primary focus will be to identify nutritional biomarkers that can be used to predict adverse related HIV clinical outcomes among Zimbabwean pediatric patients on antiretroviral therapy. Dexter is a qualified nutritionist who is currently employed as a junior faculty lecturer in the department of Nutrition Sciences at the University of Zimbabwe. He recently received ethics approval from the JREC and MRCZ and will gain approval from the UB IRB prior to recruiting participants for his study. "I look forward to spearheading research in the area of clinical nutritional pharmacology, which is an important field that has not been established in most developing countries such as Zimbabwe."

During his initial UB visit, Dexter received training in conducting clinical research including protocol development, research projects implementation and responsible conduct of research. Some of the training areas involved advanced clinical laboratory training, research ethics, grant writing, implementation science and dissemination of evidence based results to influence Public Health policies in the area of clinical nutrition and HIV pharmacology. Dexter was invited to participate as a panelist for UB's Annual Global Health Day, a UB Global Health Initiative event, where he discussed his experience in international research as an AITRP fellow focused on infectious diseases. Dexter Chagwena traveled to Washington DC, where he represented the University of Zimbabwe at the Clinton Global Initiative Universities, where he presented a Public Health Commitment to Action project being implemented at Parirenyatwa Hospital in Harare, Zimbabwe.

Mr. Marvelous Sibanda

Mr. Marvelous Sibanda, a MPhil candidate at UZ, completed his initial UB visit in May, has made great progress on his research project titled, "Risk factors influencing plasma hepatic enzyme elevations and nevirapine concentrations in children. A study in HIV infected children on generic ART in Zimbabwe."

Recently, Marvelous received approval from the Ethical Review Board for his research project from the Joint Research Ethics Committee (JREC) and Medical Research Council of Zimbabwe (MRCZ). He is now working towards getting the Medicines Control Authority of Zimbabwe (MCAZ) approval and will then prepare his submission to the UB IRB.

Marvelous has also been working on a grant proposal, Implementation of Pharmacogenomics in reducing Adverse Drug Reactions due to Nevirapine in HIV Pharmacotherapy, which was recently accepted for an oral presentation at the 3rd Annual International Conference on Advances in Biotechnology (Biotech 2013) in the Republic of Singapore.

Leading and Learning: The Dual Role of Mentor and Fellow Dr Admire Dube

"I think teaching and learning are mutually inclusive…while conducting research, both the mentor and the fellow are learning at the same time."

Dr Admire Dube
UB-UZ Mentor and Fellow

Dr. Admire Dube returned to UB in August 2012 for his 2nd AITRP research period. Dr. Dube, a faculty member at UZ, is a UB-UZ AITRP post-doctoral fellow investigating nanoparticle delivery systems for Tuberculosis chemotherapy. He is jointly mentored by Dr. Gene Morse at the University at Buffalo Center of Excellence in Bioinformatics and Life Sciences, and Dr. Paras Prasad at the University at Buffalo Institute for Lasers, Photonics, and Biophotonics. Dr Dube is also a UB-UZ AITRP mentor.

As a fellow, Dr Dube said the primary challenge is to complete a considerable amount of research within the brief UB visits. However, this is a challenge he readily takes on, as he is focused and highly motivated to achieve his goal. He enjoys establishing new contacts and collaborations, something necessary in order to conduct cutting edge research. Although he notes that this may take considerable time (from his visit), such collaborations ultimately accelerate research and lead to high quality outputs.
As a mentor, there are many experiences that Dr Dube finds rewarding in working with the AITRP fellows. Perhaps most rewarding, he said, is the excitement of fellows as they synthesize their first nanoparticles. This accomplishment is a critical indicator that both the mentor and the fellow are working well to achieve their goals.

Dr Dube's major challenge in his dual role as both a fellow and a mentor is linked to the field, itself, of Nanomedicine. Nanomedicine is a relatively new field and as such the fellows typically have no prior experience in the area. Therefore working with them is quite involving, as they need to be taught many of the basic principles and techniques, to enable them to eventually operate instruments and conduct experiments independently.

Despite this challenge, Dr Dube finds great reward in the opportunity to assist fellows in completing their research projects, while simultaneously completing his own. "I think teaching and learning are mutually inclusive. One can learn advanced techniques, which one can pass on, together with the basics, to teach another person/fellow. Particularly with research, no one knows all the answers (otherwise it would not be called research), so while conducting research, both the mentor and the fellow are learning at the same time."

The relationship between mentor and fellow is critical to learning. Dr Dube notes that it is important for mentors to be confident in their knowledge and skills, and the learner must feel confident in their mentor's abilities. He cautions that if the learning is not provided in the right context, or significantly outweighs the teaching, this can impact confidence to teach, as one may feel that there is still much to learn, and one is not ready to provide anything useful to one who wants to learn. In addition, the learner may lose confidence in the teacher, if they feel that the teacher is still learning (just like them) and therefore cannot teach them anything useful.

Fellows and Mentors Engage in

Cutting Edge Research in Nanomedicine

Tuberculosis is a major global public health concern, with an estimated one third of the world's population infected with the causative agent *M. tuberculosis*. In developing countries, the incidence of Tuberculosis is higher than the developed countries, and co-infection with diseases such as HIV, contributes to increased deaths. Zimbabwe is among the countries with high incidence of Tuberculosis (and Tuberculosis co-infections with HIV). Dr Dube's current project, "Multimodal nanoparticles for Tuberculosis chemotherapy," fits in very well with both the Global Millennium Development Goals and the goals of the Zimbabwe Ministry of Health and Child Welfare to control Tuberculosis by providing effective treatment options with shortened duration of treatment, reduced systemic side effects and limited development of drug resistance. The nanoparticles he is developing can potentially deliver anti-HIV drugs (alone or in combination with anti-Tuberculosis drugs), to target drugs to viral reservoir sites while providing immune modulating effects. Dr Dube said that this can be particularly useful in reducing viral load while protecting the patient from opportunistic infections which they commonly suffer (and die) from. In addition, his project provides opportunities for other fellows to receive training in nanomedicine. This training supports the Zimbabwe Ministry of Health's goal of increasing the number of skilled biomedical personnel.

Dr Dube's project investigates novel nanoparticle delivery systems functionalized with a ligand able to target the nanoparticles to alveolar macrophages for efficient intracellular drug, and to concurrently stimulate the immune response in the macrophages. Targeted, intracellular drug delivery is recognized as essential for effective treatment of Tuberculosis. In addition, the host immune response is recognized as a crucial component in eradication of the Tuberculosis bacterium. Therefore the nanoparticles under investigation represent a new multimodal treatment for Tuberculosis.

Dr Dube said the project will be conducted in phases. The current phase represents a 'proof of concept' study. If successful, he will move onto the next phases of the project, e.g. conducting studies in animals to determine efficacy of the system in eradication *M. tuberculosis* infection. However, upon completion of the initial phase of the project, he hopes to have established good collaborations with researchers at UB interested in Tuberculosis chemotherapy. He has already established good collaborations with researchers in the UB Department of Immunology to look at the immunological impact of the nanoparticles. Apart from the collaborations, he hopes to publish this work in leading nanotechnology journals and in the process establish the UB-UZ AITRP as a group conducting cutting edge research in nanomedicine for Tuberculosis and infectious diseases.

Ultimately, Dr Dube hopes to change the lives of Zimbabweans living with TB, and raise awareness on the benefits of nanotechnology in medicine (nanomedicine).

The facilities, equipment and scientific environment available to Dr Dube through the UB-UZ AITRP have facilitated his cutting edge research. The UB Institute for Lasers, Photonics, and Biophotonics (ILPB) has a high international reputation for research and offers an excellent scientific environment for nanotechnology work. ILPB has numerous facilities for synthesis and characterization of the nanomaterials. ILPB also has several researchers engaged in development of therapeutics using nanotechnology. Within the UB-UZ AITRP, The Translational Pharmacology Research Core (TPRC) laboratory has state of the art instruments for drug analysis and highly skilled and supportive staff. The availability of researchers and facilities on the Buffalo Niagara Medical Campus, such as the RPCI Flow Cytometry Unit, have also been critical to the implementation of his project.

Ultimately, Dr Dube hopes to change the lives of Zimbabweans living with TB, and raise awareness on the benefits of nanotechnology in medicine (nanomedicine). He said this will stimulate interest in the area of nanomedicine and enable the formation of multidisciplinary teams to conduct research to address the health care needs of the nation (using nanotechnology). In future, he hopes that a new Tuberculosis therapy can arise from this research and positively impact the health of Zimbabweans and the world as a whole.

Upon returning to Zimbabwe this Fall, Dr Dube intends to establish collaborations with fellow researchers at UZ, e.g. in immunology and toxicology, in order to continue research into nanoparticles for tuberculosis. Dr Dube envisions his project continuing for at least the next 5 years now that the Memorandum of Understanding has been implemented for the establishment of the Zimbabwe International Nanotechnology Center (ZINC). Dr Dube's project, due to the need for collaboration, is likely to enroll fellows from medicine, toxicology and chemistry backgrounds, who will work under ZINC and potentially under additional Fogarty International Center (FIC) funding. The versatile nature of the nanoparticles enables application to other disease areas of interest such as HIV/AIDS, malaria and Hepatitis C. The project can easily be expanded to include other nanoparticle systems for delivery of drugs for these conditions. For example, the UB-UZ AITRP currently has a fellow investigating supramagnetic iron oxide polymer coated nanoparticles for enhanced delivery of Tuberculosis drugs. Fellows who take up the research projects can enroll for Masters and PhD degrees with UZ and/or UB, furthering the goals of the UB-UZ AITRP, FIC and ZINC which all focus on training of future scientists. Dr Dube hopes the research outputs from these projects will help in getting funding for ZINC to purchase equipment for further nanotechnology research and to fund students conducting research projects. It is Dr Dube's hope that, over the next 5 years, UB-UZ AITRP and ZINC will become established as a leading group in nanomedicine for these diseases.

A Journey from Fellow to Mentor and Leader

By Tinashe Mudzviti, MPhil, UB-UZ AITRP Fellow and Mentor

When I embarked on this journey, I was fresh out of university and all I knew was I wanted to be a researcher.

> **"Biology gives you a brain. Life turns it into a mind. AITRP has been that *life* that transformed my biological brain into a thinking mind."**
>
> **Tinashe Mudzviti**
> *UB UZ AITRP*
> *Fellow and Mentor*

At the time I had no idea of how or where this could be achieved. The UB-UZ AITRP has managed to guide me towards that ultimate goal. The program has enhanced my capacity as a researcher, as a service provider and as a lecturer. I have become a member of the University of Zimbabwe faculty and, in the same way that I have received training through the UB-UZ AITRP, I am now imparting this knowledge to other students.

I have had the opportunity to collaborate with international researchers and to gain hands on mentorship in pharmacotherapy research. Through mentorship I have been able to strengthen my skills as an academic. From the onset I have gone through experiences that have led to growth of all the three pillars of academia (research, training and service provision). Within the scope of research I have been trained and now have the capacity to develop research concepts, formulate protocols and eventually get results which are scientifically sound. Through the support of the UB-UZ AITRP I have been supported to attend international conferences which have formed a basis for development of international collaborations and created opportunities for further work.

I have also gained first-hand experience of laboratory techniques used in a first world country that I as a student had only ever read about. This training has improved my skills as a service provider within the clinic. Through my attachment at the Erie County Medical Center (ECMC) in Buffalo, New York I was also able to gain clinical experience essential for HIV management. I am now more efficient with adherence counseling, recognition of important toxicities due to antiretroviral medicines and identification of potential drug – drug interactions that could affect treatment.

Finally what would a researcher be if they were unable to disseminate the information they have? I have become part of the University of Zimbabwe's faculty with a preference in the teaching of pharmacy practice. I have also been mentoring final year pharmacy students in conducting research projects. I have been able to pass on the vision instilled in me to pharmacy students and encouraging undergraduate researchers to aim to consider careers in academia. I have also been able to collaborate and guide undergraduate research students to publish their work in international peer reviewed journals. I have also been progressively involved in assisting fellows within the UB-UZ AITRP to develop their projects and align them with the overall goals of the program.

The program has provided a platform that has brought me from being an undergraduate student needing direction to a point where I can only but develop into a pharmacotherapy researcher. "Biology gives you a brain. Life turns it into a mind. AITRP has been that *life* that transformed my biological brain into a thinking mind."

UB-UZ AITRP Fellows Contribute to Special Issue of *AIDS Research & Treatment*

UB-UZ AITRP Fellows and Mentors contributed to a special issue of the journal *AIDS Research & Treatment* titled, "Global HIV/AIDS Clinical and Translational Pharmacology."

The issue features an editorial along with eight articles on the research challenges and the complex relationship between antiretroviral pharmacokinetics, pharmacodynamics, and pharmacogenomics.

UB-UZ Fellow Tinashe Mudzviti and his colleagues authored, "The Impact of Herbal Drug Use on Adverse Drug Reaction Profiles of Patients on Antiretroviral Therapy in Zimbabwe," and UB-NU Fellow Dr Fatai Fehintola and his colleagues authored, "Nevirapine-Based Antiretroviral Therapy Impacts Artesunate and Dihydroartemisinin Disposition in HIV-Infected Nigerian Adults."

Guest editors for the special issue included Gene D. Morse, Gary Maartens, Charles Chiedza Maponga, and Qing Ma, who are all Mentors.

The special issue is available online at: http://www.hindawi.com/journals/art/si/643239/.

Recent UB-UZ AITRP Publications

Mudzviti T, Maponga CC, Khoza S, Ma Q, and Morse GD. The Impact of Herbal Drug Use on Adverse Drug Reaction Profiles of Patients on Antiretroviral Therapy in Zimbabwe. AIDS Research and Treatment, vol. 2012, Article ID 434171, 4 pages doi:10.1155/2012/434171 PMC3313558.

Fehintola FA, Akinyinka OO, Adewole IF, Maponga CC, Ma Q, Morse GD. Drug Interactions in the Treatment and Chemoprophylaxis of Malaria in HIV infected individuals in sub Saharan Africa. Curr Drug Metab. 2011 Jan 1;12(1):51-6. PMID: 21222586. PMCID: PMC3233991

Fehintola FA, Scarsi KK, Ma Q, Parikh S, Morse GD, Taiwo B, Akinola IT, Adewole IF, Lindegardh N, Phakderaj A, Ojengbede O, Murphy RL, Akinyinka OO, and Aweeka FT. Nevirapine-Based Antiretroviral Therapy Impacts Artesunate and Dihydroartemisinin Disposition in HIV-Infected Nigerian Adults. AIDS Research and Treatment, vol. 2012, Article ID 703604, 6 pages, 2012. doi:10.1155/2012/703604 PMCID: PMC3303559

Mudzviti T, Sibanda M, Gavi S, Maponga CC, Morse GD. Implementing a pharmacovigilance program to evaluate cutaneous adverse drug reactions in an antiretroviral access program. J Infect Dev Ctries. IN PRESS; PMC IN PROCESS.

For a complete list of UB-UZ AITRP publications and abstracts, please visit our website at: https://tdm.pharm.buffalo.edu/aitrp/

UB-UZ AITRP Featured at UZ Research and Intellectual Expo 2012

The UB-UZ AITRP was featured during the UZ Research and Intellectual Expo 2012 event. Research and Intellectual Expo (RIE) is a Zimbabwean initiative by the Ministry of Higher and Tertiary Education set up to showcase research and intellectual work by Zimbabweans both at home and diaspora. Held at the University of Zimbabwe in Harare, the event brought together Zimbabweans from all disciplines to showcase and interrogate a broad range of issues under the theme Research, Innovation and Creativity for Sustainable Development. The UB-UZ AITRP booth garnered the attention of the US Embassy in Harare, which resulted in the program being featured on the US Embassy's website. See related story on page 4, and view the US Embassy's article online at: http://harare.usembassy.gov/nanotechnology.html

Cultural Explorations in Western New York

NU-UB AITRP Fellow Dr Fatai Fehintola Presents at IAS 2012

Dr Fatai Fehintola presented, the proposal "Process and Planning for an HIV Clinical Pharmacology Laboratory," at the International AIDS Society AIDS 2012 meeting. The presentation was made during the 3rd Annual Workshop on Global HIV Clinical Pharmacology Capacity Building and Implementation Research, jointly sponsored by the University at Buffalo (UB) and Northwestern University (NU). Dr Fehintola's presentation provided a rationale for, and addressed the challenges and sustainability of, a clinical pharmacology laboratory in Nigeria.

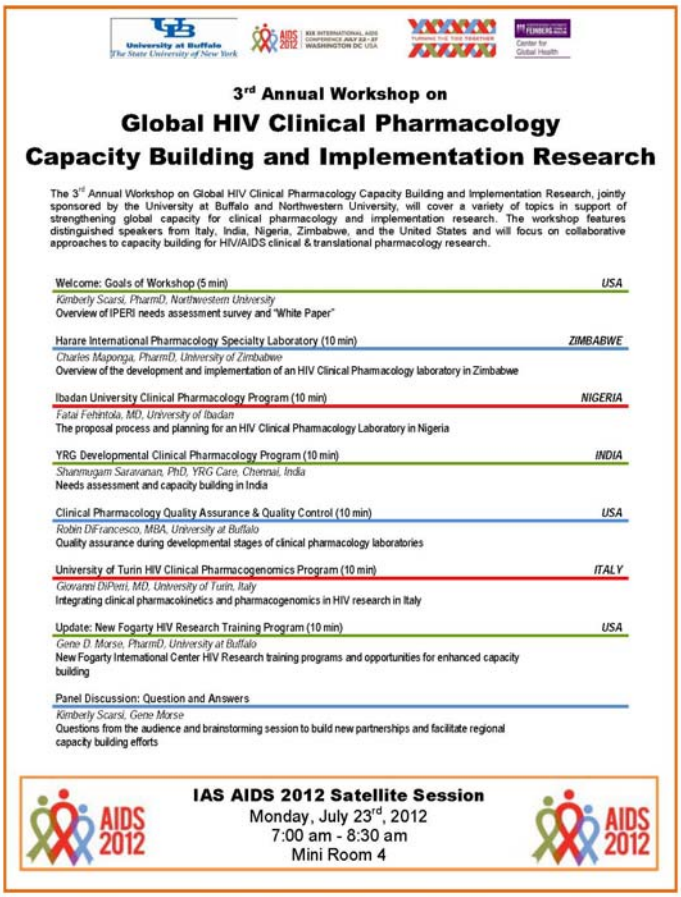
Dr Fehintola said that, "Pharmacotherapy is pivotal to the practice of medicine, the individualization of which is a *sine qua non* in some groups of patients." He said that establishing a clinical pharmacology laboratory at the University of Ibadan could provide much-needed services to many in Nigeria.

Dr Fehintola, a physician and clinical pharmacologist at the University of Ibadan in Nigeria, completed training in clinical pharmacology laboratory sciences in 2009 with the UB AITRP through a collaborative agreement with the NU AITRP. The individualized training program provided Dr. Fehintola with experience in the UB Translational Pharmacology Research Core analytical laboratory, which conducts drug assays for antiretrovirals and drug interaction studies.

"Pharmacotherapy is pivotal to the practice of medicine, the individualization of which is a sine qua non in some groups of patients."
Dr Fatai Fehintola
NU-UB AITRP Fellow

University at Buffalo and Northwestern University AITRPs Host Workshop at IAS 2012

The 3rd Annual Workshop on Global HIV Clinical Pharmacology Capacity Building and Implementation Research, jointly sponsored by the University at Buffalo and Northwestern University at the IAS AIDS 2012 Conference in Washington DC, covered a variety of topics in support of strengthening global capacity for clinical pharmacology and implementation research. The workshop featured distinguished speakers, Gene D. Morse, PharmD, and Robin DiFrancesco, MBA, from the University at Buffalo; Kimberly Scarsi, PharmD, from Northwestern University; Charles Maponga, PharmD, from the University of Zimbabwe; Fatai Fehintola, MD, from the University of Ibadan, Nigeria; Shanmugam Saravanan, PhD, YRG Care, Chennai, India; Giovanni DiPerri, MD, University of Turin, Italy. The workshop focused on collaborative approaches to capacity building for HIV/AIDS clinical & translational pharmacology research.



3rd Annual Workshop on
Global HIV Clinical Pharmacology Capacity Building and Implementation Research

The 3rd Annual Workshop on Global HIV Clinical Pharmacology Capacity Building and Implementation Research, jointly sponsored by the University at Buffalo and Northwestern University, will cover a variety of topics in support of strengthening global capacity for clinical pharmacology and implementation research. The workshop features distinguished speakers from Italy, India, Nigeria, Zimbabwe, and the United States and will focus on collaborative approaches to capacity building for HIV/AIDS clinical & translational pharmacology research.

Welcome: Goals of Workshop (5 min) *Kimberly Scarsi, PharmD, Northwestern University* Overview of IPERI needs assessment survey and "White Paper"	USA
Harare International Pharmacology Specialty Laboratory (10 min) *Charles Maponga, PharmD, University of Zimbabwe* Overview of the development and implementation of an HIV Clinical Pharmacology laboratory in Zimbabwe	ZIMBABWE
Ibadan University Clinical Pharmacology Program (10 min) *Fatai Fehintola, MD, University of Ibadan* The proposal process and planning for an HIV Clinical Pharmacology Laboratory in Nigeria	NIGERIA
YRG Developmental Clinical Pharmacology Program (10 min) *Shanmugam Saravanan, PhD, YRG Care, Chennai, India* Needs assessment and capacity building in India	INDIA
Clinical Pharmacology Quality Assurance & Quality Control (10 min) *Robin DiFrancesco, MBA, University at Buffalo* Quality assurance during developmental stages of clinical pharmacology laboratories	USA
University of Turin HIV Clinical Pharmacogenomics Program (10 min) *Giovanni DiPerri, MD, University of Turin, Italy* Integrating clinical pharmacokinetics and pharmacogenomics in HIV research in Italy	ITALY
Update: New Fogarty HIV Research Training Program (10 min) *Gene D. Morse, PharmD, University at Buffalo* New Fogarty International Center HIV Research training programs and opportunities for enhanced capacity building	USA
Panel Discussion: Question and Answers *Kimberly Scarsi, Gene Morse* Questions from the audience and brainstorming session to build new partnerships and facilitate regional capacity building efforts	

IAS AIDS 2012 Satellite Session
Monday, July 23rd, 2012
7:00 am - 8:30 am
Mini Room 4

IPERI-PARI Support Group at IAS 2012

The International Pharmacotherapy Education and Research Initiative (IPERI) which provides sustainable and relevant access to basic life-skills education for people living with HIV (PLHIV) within a Perseverance, Adherence, Responsibility, and Integrity (PARI) Support Group (SG), was accepted for an NGO booth at International AIDS Society (IAS) 2012 meeting. The organization provides life skills training within PARI support groups and contributes to ongoing psychosocial support for PLHIV that promotes adherence to HIV medications.

Ms. Fine Gavaza, a social worker with PARI SG, represented the group at the IAS Global Village. The booth featured examples of products from income generating activities made by PARI SG members, personal success stories of two PARI SG members and a poster, Care and Support in Support Groups, authored by Ms. Gavaza, Dr. CC Maponga, Mr. Martin Zende, Ms. Primrose Jaravani and UB-UZ AITRP Fellow Mr. Dexter Chagwena.

IPERI is an initiative of the University of Zimbabwe School of Pharmacy (UZ) and the University at Buffalo School of Pharmacy and Pharmaceutical Sciences (UB) in New York and represents a collaborative international HIV/AIDS clinical pharmacology research program. The program provides an infrastructure for the UZ-UB AIDS International Training & Research Program (AITRP), a fellowship training program funded by the United States National Institutes of Health, Fogarty International Center.

The PARI Support Group (PARI SG) is a key component of the UB -UZ AITRP in that the support group members promote wellness and encourage participation in clinical and implementation research

Shared Goals of IPERI and PARI SG:

- To provide sustainable and relevant access to basic life -skills education for PLHIV within PARI SG.
- To create a pool of trainers for life skills within PARI SG
- To contribute towards ongoing psychosocial support for PLHIV that promotes adherence to HIV and AIDS medications

Dr Gene Morse receives Volwiler Research Achievement Award

Gene Morse, professor of pharmacy practice and associate director translation pharmacology core at UB's New York State Center of Excellence in Bioinformatics and Life Sciences, has received the prestigious Volwiler Research Achievement Award from the American Association of Colleges of Pharmacy (AACP).

Dr. Morse, a pioneer in AIDS clinical pharmacotherapy, was recognized for his outstanding research and contributions to the fields of clinical/translational pharmacology and pharmaceutical sciences. This is only the second time the Volwiler award has been given to a clinical scientist. Dr. Morse received the award on July 17, 2012 during the AACP's annual meeting.

As the HIV/AIDS epidemic expanded and the applied therapeutics field became more complex, Dr. Morse created opportunities for graduate pharmacists who were interested in gaining more expertise in this area. These programs include an HIV Certification Program, a PGY2 HIV/Infectious Diseases Residency and an HIV Clinical Pharmacology Fellowship.

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Website: https://tdm.pharm.buffalo.edu/aitrp/
Facebook: https://www.facebook.com/pages/UB-UZ-AIDS-International-Training-and-Research-Program-AITRP

The UB-UZ AITRP acknowledges the efforts of the UB-UZ AITRP Fellows and Program Staff in the development of this newsletter. Thank you to all who contributed!