Senior Officers Meeting

Thursday 20 September

1400 – 1530 **Senior Officers Meeting - Session 1**
(Second floor meeting **room, Sanjo Conference Hall)**

1. Welcome
   - **Professor Ian Chubb (Chair, IARU)**
2. **Revised IARU Research Project proposals**
   - 2.1 **Security** *
   - 2.2 Ageing, **Longevity and Health** *

1530 – 1600 *Afternoon Tea*

1600 – 1730 **Senior Officers Meeting - Session 2**
(Second floor meeting **room, Sanjo Conference Hall)**

- 2.3 **Energy, Resources and Environment** *
- 2.4 **Approaches to funding agencies**

3. **ISSS** *
4. 2009 United Nations Climate Summit, Copenhagen

1730 **Transfer to hotels**

1820 **Transfer from Forest Hongo Hotel (Assemble in foyer)**

1830 **Transfer from Tokyo Dome Hotel (Assemble in foyer)**

1900 – 2130 *Dinner – Sushi demonstration (On-campus at Koishikawa Annex, University Museum)*

2130 **Transfer to hotels**

Friday 21 September

0745	**Transfer from Tokyo Dome Hotel (Assemble in foyer)**
0815	Transfer from Forest Hongo (Assemble in foyer)
0830 – 1000	**Senior Officers Meeting - Session 3** (Second floor meeting **room, Sanjo Conference Hall)**
	5. Movement of People
	6. Women in Universities Project
	7. Possible capacity building role for IARU *
1000 – 1030	*Morning Tea*
1030 – 1200	**Senior Officers Meeting - Session 4** (Second floor meeting **room, Sanjo Conference Hall)**
	8. IARU and Careers *
	9. IARU Membership *
	10. Agenda for Meeting of Presidents **at Yale in April 2008**
	11. Senior Officers meeting in 2008
	12. Other Business *
	13. Closing Summary
	Walk to Capo Pellicano
1200 – 1330	*Closing Lunch – Italian ("Capo Pellicano" on-campus restaurant)*
1330	**Transfer to hotels**
1815	Transfer from **Tokyo Dome Hotel (Assemble in foyer)**
18:30	*Pre-dinner drinks and informal Japanese dinner –* *hosted by Professor Kazuhiko Takeuchi* *("Umaya Akasaka" restaurant)*

** Document/s included*

Participants

Chair

Professor Ian Chubb (ANU)

Research leads

Ageing, Longevity and Health
Professor Ulla Wewer (Copenhagen)

Energy, Resources and Environment
Professor Kazuhiko Takeuchi (Tokyo)

Security
Professor Bill Tow (ANU)

Full list of participants

The University of Tokyo

Professor Kazuhiko Takeuchi
Director
Division for International Relations

Professor Keisuke Hanaki
Department of Urban Engineering
Graduate School of Engineering

Professor Yasunobu Sato
Graduate Program on Human Security
Graduate School of Arts and Sciences

Professor Kiichi Fujiwara
Graduate School for Law and Politics

Professor Hiroko Akiyama
Endowed Research Department of Gerontology
Division of Project Coordination

Dr Kaori Hayashi
Associate Professor
Graduate School of Interdisciplinary
Information Studies

Professor Akiko Tsugawa
UT Office for Gender Equality

Mr Norihiko Shimizu
Head, International Affairs Department

The Australian National University

Professor Lawrence Cram
Deputy Vice-Chancellor

Associate Professor Richard Baker
Deputy Dean
College of Science

ETH Zurich

Dr Margrit Leuthold
Office of Planning and Logistics

National University of Singapore

Professor Barry Halliwell
Deputy President (Research and Technology)

Professor Lily Kong
Vice-Provost (Education)

Professor Alan Chan
Associate Provost (Undergraduate Education)

Professor Michael Saunders
Director
NUS Environmental Research Institute (NERI)

Associate Professor John Richardson
Vice-Dean
Faculty of Arts and Social Sciences

Peking University

Mr. Li Yansong
Assistant President and Director of
International Office

University of California, Berkeley

Dr John Lie
Dean
International and Area Studies

University of Cambridge

Professor Michael Gregory

Head of the Manufacturing and Management
Division of the University Department of
Engineering

University of Copenhagen

Professor Lykke Friis
Pro-rector

Dr John E. Andersen
Director
International Office

Mr Hans Halvorsen
Manager
Campus Programme

University of Oxford

Professor Elizabeth Fallaize
Pro-Vice-Chancellor for Education

Dr Heather Bell
Director of International Strategy

Yale University

Mr Don Filer, Director
Office of International Affairs

Dr Jane Edwards
Associate Dean for International Affairs

IARU Secretariat

Mr Iain Watt
Director

Ms Amelia Whitelaw
Co-ordinator

SO2.1 Security

Proposal for IARU Collaborative Research Program on Security

Approaching two decades after the Cold War's demise, no broad consensus has yet been reached on how to conceptualize or implement international security. Without rectifying this discrepancy, the risk that emerging dangers to the international order will endanger the survival of humanity becomes increasingly acute. These threats are materialising at both state-centric and non-state centric (sub-state and transnational) levels: the proliferation of weapons of mass destruction (WMD), the rise of new and highly contentious regional power balances and the persistence of long-standing security dilemmas between states reflect the first typology; the intensification of international terrorism, the ramifications of more frequent pandemics and the geopolitical ramifications of climate change and energy security illustrate the second category. It is the responsibility of all those who are in the business of generating and conveying knowledge to prioritise this challenge and to facilitate policy-makers' application of more imaginative and enduring approaches to realising international peace and stability. As a concentrated resource of world class research and learning, the International Alliance of Research Universities (IARU) is a highly appropriate venue for leading this process.

Proposed Research Framework

Our proposal is entitled **Regional Perspectives on Global Security**. It has been developed by a group of IARU scholars representing all ten institutions comprising that association who convened at a workshop in Cambridge in November 2006. They have since worked closely and cooperatively to develop the proposal under the leadership of Cambridge University, the University of Tokyo and the Australian National University. We envision that each IARU member-institution will provide scholars and analysts that will make integral contributions to the Project. We also anticipate that a small and select grouping of internationally renowned analysts from independent think tanks and from other centres of international security studies will play an important supportive role to advancing our research aims.

The Program intends to harness the unique combination of diverse regional expertise and global coverage of the IARU membership to undertake a program of comparative research into a range of global security issues. It starts from the important proposition that threats to security differ widely from region to region but that *the major geopolitical trends of international security politics will basically flow from cooperation and competition between Eurasia and North America over the next two to three decades* (Middle East security problems will be largely shaped by interaction between external actors from these other two geographic entities and by the trends that flow from Eurasian-North American security dynamics). As will be stipulated below, we argue that *prospects for*

international stability are greater if the global order that sustains it is able to accommodate both structural and ideational change shaped by key affiliations (coalitions and institutions as well as by, cultural, technological and human security factors. We believe that IARU is uniquely placed to highlight this phenomenon by drawing on the regional expertise of its member institutions and generating comparative research projects that are grounded in this geographically framed context.

Conceptual Approach: A second major proposition is that such interaction will become increasingly 'transnational', spanning a wide range of both 'traditional' and 'alternative' or human security issues. The key to managing this diverse array of challenges is to identify and shape relevant paradigmatic lines of analysis for integrating them into commonly accepted points of reference and courses of policy action. Our program will initially adopt a notion of security which is underscored by the interdisciplinary and comparative nature of international politics of our time. As stipulated above, our distinct focus is on ***cross-national security issues*** - security problems which cut across state boundaries, and involve multiple states and non-state actors. By adopting a cross-national approach, we aim to bridge the global-regional gap that has characterised much of the literature of security. While our regional diversity allows us to study regions and elucidate their distinctive characteristics, our cross-national approach allows us to explore how regional and global security issues are connected. Thus, we move beyond the limitations of the more conventional 'regional' studies of security, which tended to study areas in isolation. In addition, the program adopts a ***comparative regional approach***. By studying cross-national issues in a comparative regional framework, the IARU Comparative Regional Security program will identify the principles which will enable us to address shared and common security problems. This work should be valuable in informing practical policymaking around the world. Finally, the approach proposed is ***actively interdisciplinary***, bringing together diverse specialisations including international security, economic risk analysis, the technical safety of systems, and policing and domestic order. The program will aim to facilitate the integration and mutual translation of these previously unrelated bodies of knowledge.

Proposed Research Areas

The Program proposes to focus initially on the **five key areas for research**:

1. Changes in the distribution of power, particularly in the context of how 'rising powers' in the international security system such as China, India and Iran may increasingly challenge what has been a predominantly American unipolar order in place since the end of the Cold War and, as importantly, how the U.S. and its traditional allies and friends in Europe and Asia respond to such a challenge. The Program is particularly interested in examining ongoing regional approaches to shifts in the global distribution of power that entail bilateral and multilateral dimensions; that involve regionally 'inclusivist' versus 'exclusivist' designs (and tensions emanating from the exclusivist model) and that may imply alliance transformation.

2. Security Institutions (partially flowing from 1. above), especially exploring the variations in institutional designs across various regions, allowing better understanding of the possibilities for enhanced cross-regional cooperation in facing common security issues. Specific topics include the intersection of economics and security (i.e. the European Community, APEC, the East Asian Community); the 'broadening and deepening' of existing institutions to entail more comprehensive security agendas (a more 'globalised' NATO; successor arrangements to U.S. 'hub and spokes' arrangements in Asia); and future security coalition operations involving both Eurasian and North American components in more distant regions (i.e. the Middle East and Africa).

3. Identity and Cultural Issues, particularly examining the intersection between security cultures. Cultural issues are integral components of other research areas identified in this report, and we expect significant scope for collaboration between the various research teams. Specific research projects might include comparative security culture and multicultural issues.

4. Threats emanating from changes in technology, including the way technology changes affects patterns of resource competition, weapons of mass destruction, security implications of technologically-driven environmental issues, and ethical issues connected with technological change in areas such as surveillance technology.

5. Transregional and human security issues, including questions of praxis, such as how states protect borders in an age of migration, and the normative dimensions of security, such as the tensions between 'freedom from want and fear' as outlined by the United Nations Development Programme and various 'securisation' processes enacted to ensure regime security in various Asian polities; the balance between internal and international security; and the relationship between security and the diverse ideological systems.

Research Implementation

Short-Term Project Implementation

The lead IARU institutions for this Project agreed at Cambridge and in subsequent discussions between various participants of that workshop that Project implementation would be achieved most efficiently by adopting a 'grafting strategy'. This would integrate existing research interests and expertise of associated security scholars with longer-term Project development by incorporating a 'building block' strategy that would ultimately encompass all five designated Project research areas. Currently, the first and second research areas (power distribution and institutional designs) most directly reflect the research interests and undertakings of those scholars involved in the November 2006 Cambridge meeting but we are keen to expand both the range of participants and the scope of concept for Project Development .

In conversations between Professors Christopher Hill (Cambridge) and Professor William Tow (the Australian National University) and between Tow and Professor Kiichi Fujiwara (University of Tokyo) conducted during June and July 2007, the 'grafting approach' surfaced as the most appropriate and efficient means for Project initiation. This could be implemented by using a two-day workshop already scheduled to be convened at the ANU in Canberra (with an additional two days scheduled for Sydney) on U.S. alliance relations with Japan and Australia in the first week of April 2008. This gathering would serve as a catalyst for discussion of the broader, IARU-work on Regional Perspectives on Global Security. The IARU Project-related discussion could be held during a third day in Canberra. Professor Fujiwara would lead a delegation of five Japanese scholars to participate in both the U.S. alliance and IARU components. Professor Hill and two or three other IARU colleagues from the University of Copenhagen, Yale University and the University of California at Berkeley could also attend both workshop components. An appropriate scholar from Peking University and a counterpart from National University of Singapore (NUS) could also participate in both components. We would also invite specialists from other ANU units to attend the workshop (for example, from the Centre of Biosecurity, the Crawford School of Economics and Government and the Regulatory Institutions Network or RegNet) as a means of infusing more multidisciplinary input into the proceedings.

The Australian National University's research office will provide cost-effective financial support for the attendance of IARU-based delegates at these discussions. Prominent American research analysts sponsored by the National Bureau of Asian Research's (NBR's) Washington D.C. office and from the Lowy Institute for International Policy in Sydney in both workshop discussions are also scheduled to be involved. NBR and Lowy both have experience with soliciting financial support from key foundations interested in international security issues and other appropriate external funding bodies. Both have expressed a willingness to advise this Project's coordinators on ways to effectively approach such bodies. It may be worth inviting representatives from one or two such foundations to attend the April 2008 Canberra workshop (the ANU has attracted funding from the Ford Foundation over the past year to underwrite a project on Sino-Australian relations and that Foundation's Beijing office director will be attending this Project's Canberra component in late October – a possible precedent to foundation representation at the April 2008 meetings).

At the April 2008 workshop, IARU Project leaders and participants will take up the following agenda:

- Define more extensively the five inter-regional, multidisciplinary research clusters outlined above by designating specific research strategies for each cluster and identifying key scholars from the ten IARU institutions who could participate in specific cluster activities;
- Link each cluster to cross-national and interdisciplinary research strands; and
- Identify strategies on how these integrated clusters and strands can be represented as a coherent and competitive research design that appeals to international funding bodies

Following the April 2008 workshop, this research design would determine the type and extent of collaborative work undertaken for the Project. We anticipate a multi-year process of conferences and publications that will produce substantive work in each cluster area, as well as building connections between the work in each cluster to explore overarching themes and conclusions. The clusters would also provide excellent opportunities for PhD scholars, and might need to draw in expertise from non-IARU institutions, especially in the developing world, and from policymakers working in those states where IARU institutions are located.

Timetable

20 September 2007 – IARU Senior Officials Meeting (Tokyo) deliberates security proposal content; makes recommendations for revisions to research design. Preliminary drafts of research proposals for submission to potential funding sources can be prepared and, if sufficiently strong, submitted to these sources for review. Deliberations here will ensure that the funding solicitation effort is sufficiently cohesive to avoid the appearance of overlap or disarray in this process.

3 April 2008 – Inaugural IARU Security Project meeting at the ANU to confirm research agenda and a concrete research design. Designate IARU scholars to lead and/or to participate in respective research clusters. Update specific funding strategies (in conjunction with feedback from the September 2007 meeting in Tokyo).

April -December 2008 – IARU Project leaders continue to submit research proposals to key foundations and possible corporate interests supporting work in international security in their respective countries. Among those targeted will be the MacArthur Foundation's Program on Global Security and Sustainability; Carnegie Corporation of New York's International Peace and Security Program; the Ford Foundation's Peace and Social Justice Program, Economic

and Social Research Council (ESRC) of the United Kingdom of Great Britain; the Japan Foundation; Rockefeller Foundation Global Inclusion Program; Rockefeller Brothers Peace and Security Program; U.S. Institute of Peace; Alfred P. Sloan Foundation's Bioterrorism Program; the U.S. Social Science Research Council Global Security and Cooperation Program. This may entail scheduling visits to targeted foundation and corporate headquarters to promote research significance and to seek specific cluster funding. Assuming some funding proposals are successful, a Project committee identifies and implements hiring procedures for appointment of a Project Director.

January 2009-December 2009 (Phase One): Embark on initial research in each cluster and target publication venues/outlets for disseminating preliminary research results. Appoint a Project Director, a Project Director of Studies and key support staff during first six months. Project infrastructure and processes will commence during July-December 2009. Much of this can be done via electronic communications (e-mails, Project-specific chat centres, etc.). Hire one research assistant for each cluster to acquire and integrate cluster data, to work with principal cluster researchers toward implementing research design strategy and build a database of documentary evidence. Demarcate fieldwork interviews based on content analysis of secondary source material. Inaugural workshops for each cluster will convene at an appropriate interval during the first year of research and cluster leaders will meet with the Project Director and Director of Studies to set the context for integrating research approaches.

January-December 2010 (Phase Two): Fieldwork undertaken for IARU researchers in each of the five Project clusters. A second tranche of cluster workshops will convene toward the end of the year to benchmark both individual cluster research and the integration of that research with overall Project objectives. Leaders of each Cluster will meet intermittently with the Project Director and more frequently with the Project Director of Studies to ensure quality control and Project integration. Researchers for all clusters will be recruited from the ten IARU institutional affiliates with possible support from selected analysts outside the IARU framework (think tank or other research centre personnel). Although subject to revision, a fieldwork framework along the following lines is envisioned

- Cluster 1: Changes in the Distribution of Power: Cluster researchers conduct interviews with policy-makers and experts within the three regions under review (Europe, Asia and North America). European interviews could focus on NATO Hdqs in Brussels, government officials in London, Paris, Berlin and think tanks in the UK, France, Germany and other key NATO cities; Asian interviews could focus on ASEAN Hdqs, in Jakarta and think tanks in Singapore and ASEAN, U.S. Pacific Command in Honolulu; defence and foreign ministries in Tokyo, Beijing, and Seoul; North American interviews would be conducted primarily in Washington, D.C.

- Cluster 2: Security Institutions: Cluster researchers will liaison with and interview officials and independent analysts at ASEAN Hdqs.(Jakarta), APEC Hdqs. (Singapore); European Community and NATO Hdqs. (Brussels), and Washington/New York (UN Hdqs.) and various experts at European and Asian think tanks/research centres

- Cluster 3: Identity and Cultural Issues: Cluster participants will interview experts and analysts at key regional think tanks and non-governmental organisations or NGOs (this could take the form of small forums, roundtables or workshops for 1-2 days duration). Experts on strategic culture that could be consulted or associated with the Project from University of Wales at

Aberystwyth, Harvard University; Cornell University; Columbia University; the Lee Kuan Yew School at NUS in Singapore; the International Institute for Strategic Studies in London, etc.

- Cluster 4: Threats and Technology: Cluster participants will interview experts and analysts at government agencies and independent think tanks. Those consulted or possibly affiliated with the Project might include: the Belfer Centre at Harvard, the RAND Corporation; the Rajaratnam School for International Studies in Singapore; the Center for Strategic and International Studies in Washington, D.C.; the Center for Science, Technology and Security Policy AAAS, Washington, D.C.; the Georgia Institute for Technology in Atlanta; Kings College in London; and Tsinghua University in China

- Cluster 5: Transregional and Security Issues: Cluster participants will interview and interact with the Human Security Report Project at Simon Fraser University in British Columbia; the Human Security Program at Fletcher School of Law and Diplomacy; Centre for Research on Inequality, Human Security and Ethnicity, Oxford University; CERI Program for Peace and Human Security at Sciences Po, Paris; Korea University and UNESCO.

January-December 2011 (Phase 3)

January or February 2011: Workshop involving all cluster researchers presenting final results.

March-September 2011: Preparation of major volume incorporating the findings of all research clusters

November-December 2011: Project culmination: publication of Project volume; dissemination of Project results to international media and in selected print outlets (major journals, op-ed pieces in dailies; briefings to various government agencies and other public fora). We anticipate convening a major conference near the end of the Project's duration involving the Project's key players (academic and administrative leaders, including Cluster Leaders and Cluster participants who have authored the best papers/chapters). The Project Director and Director of Studies will work with key funding groups and agencies to highlight their roles in supporting the project as an integral part of the conference. Key media outlets will be represented at the conference and the overall theme of IARU collaboration will be underscored as a major theme.

Funding and Budget

The proposed Program appears to fit well with the priorities and agendas of a number of major grant-making foundations, as well as national research funding bodies. Various issue-areas raised at the April 2008 workshop, for example, should appeal to such funding agencies as the MacArthur Foundation (i.e. regional arms control in the Asia-Pacific), the Ford Foundation (which has an interest in both cultural and technology issues as they impact developing societies) and the Japan Foundation (which is intensifying its interest on human security issues). Various American, Japanese, European and Australian government agencies also fund occasional studies related to both the power distributions and power shifts of state-centric actors and on institution-building. We believe that with appropriate support from IARU, the program stands an excellent chance of attracting funding support from such bodies.

Specific budget projections will be completed for dissemination and review at the April 2008 meeting. Some funding proposals may already have been prepared and submitted to appropriate foundations/agencies by that time.

A projected Project budget is presented in the Model and Costing Draft prepared by Sean Downes.

The major components are stipulated here:

Personnel

1 Project Director: $A300,000/$US237,362 per annum including oncosts (Full Professor level) $A900,000/$US712086 over three years.

1 Project Director of Studies $A140,000/$US110790 per annum including oncosts (Associate Professor level) $A450,000/$US332370 over three years.

1 Senior Project Administrator, reporting to the Project Director and engaging in overall Project managemen. (equivalent of Level 8 Australian National University administrator) $A100.000/ $US80,000 per annum including oncosts = $A240,000/$US240,000 over three years

1 Full-Time Research Assistant/Administrator per Cluster (current Australian Research Council Level 7) = $A85,000/ $US67253 per year including oncosts. Three years per cluster = $A255,000/ $US 201993. Five RAs X 3 years = $A1,275,000/$US1,011683. Each Research Assistant assist their particular Cluster Leader in managing the Project cluster.

$A10,000/$8000 stipend for one Project Cluster Leader cluster per annum. (Note: Other Cluster research participants will be compensated with $A1000 honoraria for papers delivered at Cluster workshops, etc. – see below). 5 Cluster leaders x $10,000 = $50,000 x 3 years = $A150,000.

$A40,000/$US32,000 per year for HDR Scholars/ 1-2 HDR Scholars working with each Cluster over a 3-year duration.

Logistics and Maintenance Items (See Downes Document for Costing)

Project workshop venue rentals, office space for Project Director, Project Director of Studies and Project Chief Administrator for annual cluster workshops, etc.

Annual Cluster Workshops $A70,000/$US60,000 per workshop for each Cluster per year.

Final Project Conference: $400,000 = $US320,000

Travel

$A60,000/$US50,000 for Program Director/Director of Studies annual travel

Cluster Leader/Participant costs worked into $A75,000 annual workshop costs stipulated above.

IARU Cash Contributions

Seed Funding: $A75,000/$US60,000

Program Inception Funding: $A175,000 = $US138,539 ($A17,500/US13857 per IARU institution)

*IARU 'In-Kind' Contributions (*Time in lieu for academics, infrastructural support, etc.) $A2,997000/ $US2374995

Initial Project Cost Estimate: $A 13588300/$US10769700

Indicative Model and Budget for IARU collaborative research program on Security

This document is to be read in conjunction with the overall proposal for the IARU Collaborative Research Program on Security, which provides the necessary detail on the concept, objectives and arrangement of the Program.

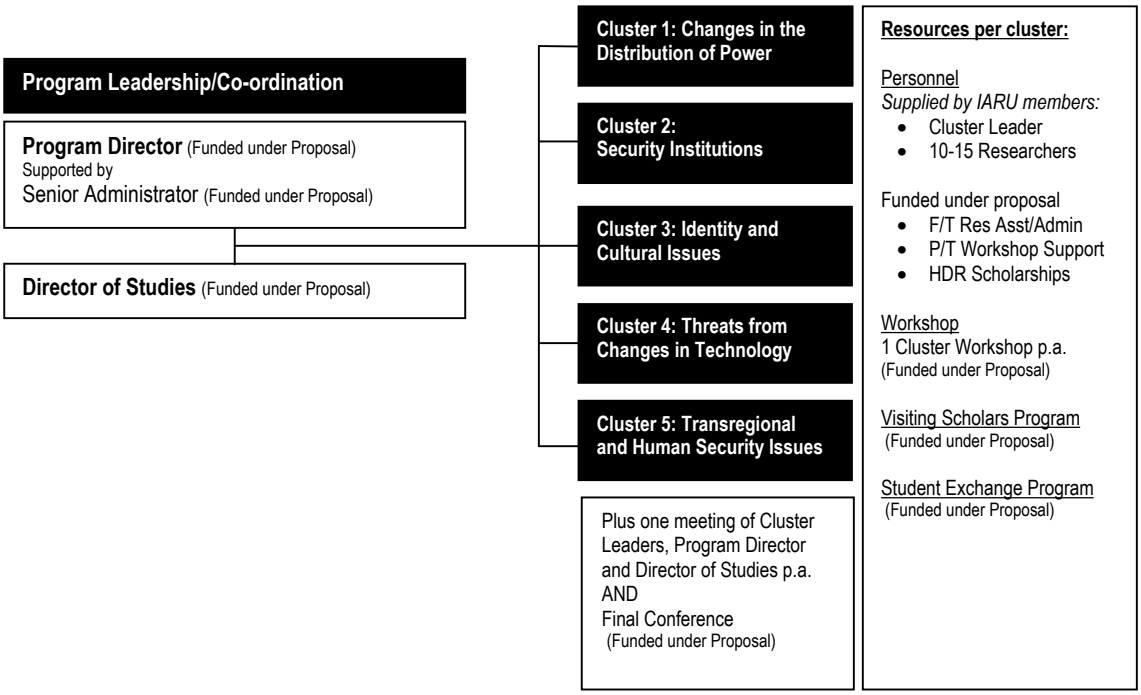
Conceptually, the Program will comprise five interconnected teams each operating in a particular thematic area, and with a defined palette of goals and resources. They will be directed by a highly-engaged and skilled Program Director who will be have executive carriage of the overall objectives as well as relationships with funders, executives of IARU members and engagements with significant government, policy and industry bodies. The first-rate research teams in each cluster will be tightly integrated through annual meetings, interchanges and under the co-ordination of a talented Director of Studies. The reach and effectiveness of the activities will be enhanced by an active Visitors Program. Alongside the deliverables arising from the key academic, policy and applied research foci, a focus on training the next generation of researchers is emphasized, through provision for at least 10 HDR Scholarships supported by a vibrant student exchange program. The projkect will culminate with a major international conference which will bring together the whole corpus of the Program's findings and deliverables, and will be attended by a wide array of senior academics, government, industry, security and policy representatives.

Apart from the funding required to create and operate the centre, the most significant input is the time contribution of the researchers involved. These researchers will be among the top-ranked in their respective fields, relative to their experience. It is anticipated that a total of 90 person years of study will be devoted to the Program by IARU members, along with all infrastructure and indirect inputs needed to support their activities.

Under this proposal, funding of around $7.1M will be sought, and this will be matched with cash and in-kind contributions from IARU member institutions of around $6.5M over the life of the Program.

Following are an indicative model of the Program and an outline of the inputs required.

Model of Program Components



Indicative Budget

Program Funding to be Sought

Program Resources will be drawn from both IARU members participating in the network, and operational funding to be generated. Below is a description of the items required, and followed by a breakdown of costs and total funding needed.

Note: all salary figures below are inclusive of salary-related on-costs (nominally 30%).

Program Leadership and Co-ordination

The Program will be convened and led by the **Program Director**. This position will be funded by the Program, nominally at around $300,000 p.a. and located at one of the participating institutions. The Director will be supported by a full-time **Senior Administrator**, nominally engaged at ANU 8 or equivalent ($100,000 p.a.), funded by the program and housed at the Director's institution.

A **Director of Studies** will co-ordinate the overall research activities and provide academic liaison between each cluster. The position will work closely with and under the direction of the Program Director. Funding will come through the Program, with the full-time appointment at Level D or equivalent to be located at ANU ($140,000 p.a.).

Additionally, an allowance of $60,000 p.a. will be required to cover the **travel and expenses** of the Program Director and Director of Studies.

Startup Funding

Given the level of organization and preliminary work required to set up the program's structure and activities, a **start-up float** of $100,000 is required. This will cover recruitment, facility set-up, communications infrastructure and website communications, purchase of equipment, etc. $15,000 will be allocated to each cluster and $25,000 for the inception of central program co-ordination.

Cluster Operations

The five clusters will operate autonomously, with each being led by a **Cluster Leader** supplied by one of the institutions engaged in that cluster, and supported by a $10k p.a. stipend. Each cluster's activities will be carried forward by a group of **10-15 researchers** spread across the institutions contributing to it. Cluster activities and research foci will be supported by a full-time **Research Assistant/Administrator**, nominally engaged at ANU 7 or equivalent ($85,000 p.a.), funded by the Program and housed at the Cluster Leader's institution. Each Cluster will also have the opportunity to engage 1-2 **HDR Scholars** at a time, funded by the Program – up to $40,000 per scholarship will be made available to cover fess and allowances. To foster direct interchange and dissemination of ideas, a **Visiting Scholars Program** is required. Each cluster will have $40,000 p.a. to provide for the travel and expenses associated with hosting first-rate scholars from outside institutions. Also, to allow the next generation of researchers to broaden their experience and knowledge-base, provision of $20,000 p.a will be made to each cluster to support a **Student Exchange Program**.

Workshops and Meetings

Each Cluster will hold an **Annual Cluster Workshop** to integrate the cluster's activity with overall Program concepts. This event will be funded by the Program and will involve up to 30 people. $70,000 is allowed per workshop to cover the infrastructure, production of papers, travel costs of cluster researchers and other invited participants, etc. A part-time administrator will be made available to each cluster for 6 weeks p.a. to co-ordinate arrangements.

Additionally, an **Annual Program Meeting** of the Program Director, Director of Studies, Senior Administrator and the Cluster Leaders will take place. Each Cluster Leader will report on the Cluster's activities and progress and how that progress co-relates with the overall Program plan.

One of the main Program Deliverables will be the **Final Conference**. This will bring together the entire corpus of the Program's work and will be attended by significant representatives from government, industry, academia and other stakeholder/end-user bodies. It will be a large-scale meeting over several days. Infrastructure and resource requirements will be large and complex. There will be a very significant cost in bringing together around 20 Program members, IARU Vice-Chancellors or their representatives, members of funding bodies and a wide array of invited participants/attendees. One particularly large resource requirement will be the development of conference materials – synthesing the results of the Program's work over its life. Based on experience with similarly-scaled events, an allowance of $400,000 is indicated. However, the shape and scale of the final conference will be finalized following discussions with the Program's significant funders.

Cash contributions from IARU members

A major meeting of IARU participants to be held at the Australian National University in the first week of April will result in a range of identified activities, small meetings and other items needed to prepare the proposal for acceptance and submission to potential funders. These activities will require face-to-face meetings between key Program people, external agencies and the like as well as production costs for proposal documentation, website, etc.. **Seed funding** of $75,000 is required to cover these costs. To defray this, each participating IARU institution will be asked to contribute $7,500. This seed funding differs from the startup funding noted above in that it is required before Program funding is generated.

Additionally, **Program inception funding** of $175,000 should be allocated. This will cover the cost of engaging an interim Program Director, whose role it will be to provide the initial impetus and action needed to facilitate program startup – engaging with the bodies providing the Program's funds, guiding the recruitment of the Program Director and Director of Studies, ensuring that the Program's information and infrastructural networks are adequately conceived and commenced, etc. Also, initial meetings of the Cluster Leaders will be required to ensure that necessary relationships, understanding of objectives and commonality of direction are in place from the outset.

In-kind contributions from IARU members

The major input from IARU members will be the salary and infrastructure costs of the academic staff participating in the Program.

The five **Cluster Leaders** will be academics at senior Professorial level, at an average full-time salary of $180,000. Each will devote around 10% of their time to Program activities representing a total contribution of $90,000 p.a. - $270,000 overall.

As noted, each cluster will engage up to 15 **Cluster Researchers** in pursuit of its objectives. These researchers will vary in their overall time commitment and salary level. Experience in collaborative projects suggests that an average of around 15% of full-time engagement per researcher will be devoted. The notional average salary including on-costs per researcher (who will generally range from senior Professorial level to experienced postdoctoral academics) will be around $110,000 p.a. Taking an average of 12 researchers per cluster, the total in-kind contribution per annum will be $990,000 for a grand total of $2,997,000.

At this stage of our proposal, it is impossible to pinpoint the exact level of **Infrastructure Support** provided. This support covers items such as office accommodation, facilities, general academic administrative support, insurance, human resources and other central administration and the like. The then-Australian Vice Chancellor's Committee has estimated that indirect research support costs average around 92% of the total salaries of researchers engaged. This figure is the standard method of quatifying indirect costs in major Australian grant rounds. Based on the figures indicated above, this represents an in-kind contribution of $2,980,800.

A breakdown of required inputs by type and source follows overleaf.

Indicative Costings

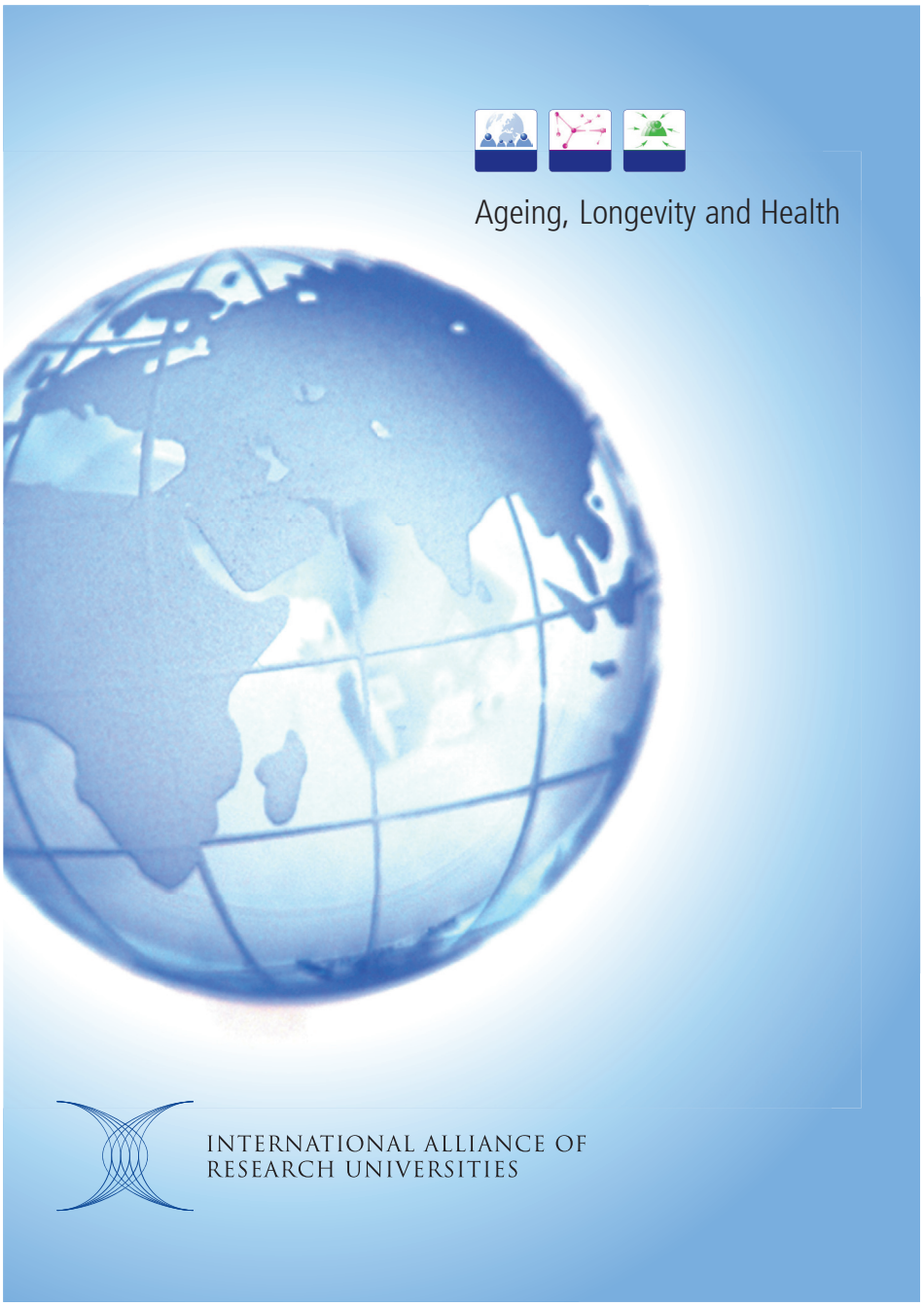
Budget Item	Requirement	Cost
Program Funding to be Sought:		
Program Director	$300k p.a. x 3 years	900,000
Senior Administrator	$100k p.a. x 3 years	300,000
Director of Studies	$140k p.a. x 3 years	420,000
Travel and Expenses	$60k p.a. x 3 years	180,000
Program Startup	$5k per cluster + $25k for central program co-ordination	$50,000
Cluster Leader Stipend	$10k p.a. x 5 clusters x 3 years	150,000
Cluster Research Admin/Asst	$85k p.a. x 3 years x 5 clusters	1,275,000
Annual Workshops	$70k ea x 5 clusters x 3 years	1,050,000
Workshop Admin	6 weeks p.a. x 5 clusters x 3 years x $1,950 p.w.	175,500
HDR Scholarships	$40k p.a. ea x 2 x 5 clusters x 3 years	1,200,000
Cluster Visitors Program	$40k p.a. x 5 clusters x 3 years	600,000
Student Exchange Program	$20k p.a. x 5 clusters x 3 years	300,000
Annual Program Meeting	$30k p.a. x 3 years	90,000
Final Conference	$400k	400,000
TOTAL FUNDS TO BE SOUGHT FROM EXTERNAL AGENCIES:		**7,090,500**
Resources to be Supplied by IARU Participants:		
CASH		
Proposal Seed Funding	$7.5k x 10 IARU institutions	75,000
Inception Costs	$17.5k x 10 IARU institutions	175,000
TOTAL CASH TO BE PROVIDED BY IARU MEMBERS:		*250,000*
IN-KIND		
Salaries of Cluster Leaders	$180k av. salary @ 0.1 FTE x 5 clusters x 3 years	270,000
Salaries of Cluster Researchers	$110k av. salary @ 0.15 FTE x 12 researchers x 5 clusters x 3 years	2,997,000
Infrastructure & Indirect Costs	92% of salaries of Cluster Leaders/Researchers	2,980,800
TOTAL IN-KIND TO BE PROVIDED BY IARU MEMBERS:		*6,247,800*
TOTAL CONTRIBUTIONS OF IARU MEMBERS:		**6,497,800**

Notes: All salaries include 30% on-costs. FTE means Full-time Equivalent

Total Program Budget:

Funding to be Sought (Cash):	$7,090,500
IARU member Contributions (Cash + In-kind):	6,497,800
TOTAL:	**$13,588,300**

SO2.2 Ageing, Longevity and Health



Preface

Ageing, Longevity and Health

Introduction

One of the main objectives of the global alliance "The International Alliance of Research Universities" (IARU) is to instigate initiatives and resolve global challenges on the basis of fruitful research cooperation between research-intensive universities at an international level.

Under the headline "Global Change" the IARU presidents have decided to prioritize: "Ageing, Longevity and Health" as a specific IARU research topic. Through discussion and selection researchers at the IARU universities have chosen to focus on three projects that represent specific research areas where the IARU universities can cooperate and where there are unusual opportunities for major advances:

- Health Policy Challenges of Ageing Populations
- Neurodegeneration: The Role of Oxidative Stress
- Evolutionary Medicine

The research projects described here define a unique research agenda which will also form the basis for the development of innovative education and training platforms amongst the universities. The Ageing, Longevity and Health project represesents an ideal match between the global coverage of the IARU-universities and their cutting edge research.

The research projects are planned for 3 years and the proposed financial support for each project is USD 1.2 mio for research activities + USD 150.000 for communication and dissimination purposes. Moreover, 25 % overhead is requested for each of the three themes.

A website on the IARU ageing theme has been established at http://ageing.iaru.ku.dk/. Its primary purpose is to draw attention to this project among researchers, pre- and postgraduates, as well as other interested parties. We also expect the website to offer a working platform with the ability to "blog" and exchange documents amongst the researchers involved.

Dissemination of public information regarding the problems and research in ageing is also a priority. Researchers at the University of Copenhagen have set up an exhibition on ageing and health. The title of the exhibition is "Oldetopia," and it will open in Copenhagen in the autumn of 2007. Subsequently, this travelling exhibition will be offered to other participating universities of the IARU.

Research Framework

Health Policy Challenges of Ageing Populations

Aims and Plans: The overall aim is to analyze how societies adjust to the health consequences of demographic ageing so as to develop a framework for assessing the effectiveness of different health and long-term care policy models. This entails two major approaches: one is assessing how changes in policies, social institutions, and culture articulate and shape the balance of responsibility between families, individuals and the state; the other is developing criteria for policy evaluation within a purpose-built comparative framework taking dynamic demographic context into account.

Rationale: The guiding assumption for this proposal is that the feasibility and effectiveness of policy in any given country must be assessed on the basis of an analysis of context, specifically: the interaction between demographic trends, formal policy, institutional change, and cultural values. Perceptions of problems and their urgency, policy responses, and policy implementation will differ because of these contextual factors, and policy effectiveness must be judged in terms of a framework that takes these into account.

Neurodegeneration: The Role of Oxidative Stress

Aims and Plans: This proposal seeks funding for a cutting edge collaborative programme of research focusing on the role of

oxidative stress, linking molecular science with epidemiological approaches to develop interventions that may delay or prevent brain ageing. The innovation of this project lies in bringing together research from multiple approaches to increase our understanding of how oxidative stress, a hallmark of ageing, at the cellular level translates into everyday manifestations of brain ageing, such as memory loss.

Rationale: At the molecular and cellular level studies have shown that oxidative stress is a major cause of neurodegeneration leading to brain ageing, cognitive decline and dementia. More specifically, DNA damage is produced by the increased presence of molecules carrying reactive oxygen, also commonly known as free radicals. These free radicals can either be produced by our own organism or result from various environmental exposures. Accumulation of DNA damage has a particularly adverse effect on brain cells, leads to neuronal death, and has been linked to Alzheimers Disease and increased amyloid plaque. The DNA damage response signalling pathway seems to be altered in Alzheimers Disease and levels of protein involved in cerebral DNA damage recognition and repair have been shown to be significantly reduced in Alzheimers Disease.

Evolutionary Medicine

Aims and Plans: Ageing is viewed by evolutionary biologists as an unavoidable consequence of selection for reproductive performance early in life, and ageing humans have particularly serious problems with pathogens that have evolved antibiotic resistance and whose virulence has evolved in response to human interventions. Here the overall aim is to establish the first world-wide research and training program in Evolutionary Medicine and to set the agenda for this rapidly developing field.

Rationale: The evolutionary theory of ageing applies to all organisms, in particular to humans and to their pathogens and parasites. With respect to ageing, genes whose deleterious effects are expressed at more advanced ages are not removed by selection, and traits that enhance reproductive success are often genetically correlated with lower somatic maintenance. Two recent findings appear to be generally valid: dietary restriction extends lifespan in all species examined, and extensions to lifespan appear to be controlled by the same insulin and insulin-like growth factor signalling pathways. However, we need to know what levels of dietary restriction produce which extensions of lifespan, what factors elicit insulin and insulin-like growth factor signalling responses in humans, how large the effects are, and what side effects might exist. We also need to know how pathogens evolving in response to human interventions interact with ageing humans. Does the neglect of maintenance that produces ageing also erode our ability to resist rapidly evolving pathogens and emerging diseases? Here, a clear conceptual framework connects evolutionary and molecular medicine with concrete expectations of particular molecular mechanisms based on non-human experimental models. Thus Evolutionary Medicine makes important contributions that complement those of other fields of medical research in ageing.

On behalf of the IARU researchers

Ulla Wewer, Professor, DM.Sci
Dean of the Faculty of Health Sciences
University of Copenhagen
Denmark

HEALTH POLICY CHALLENGES

Health Policy Challenges of Ageing Populations

IARU Partners Involved
Australian National University
National University of Singapore
Peking University
University of Copenhagen
University of Oxford

Introduction

The general consensus that ageing societies should direct resources to extending healthy life expectancy has often led to a focus on the improvement of medical technologies, health delivery systems, and long-term care. This research proposal goes beyond that technocratic approach by analysing the health policy challenges of ageing societies within a broader socio-cultural framework – one that encompasses not only competing political ideals about the fairness and legitimacy of different policies, but also the changes in demography, social institutions and common culture that underpin and shape policy responses. A comparative and contextualizing approach will allow development of criteria for assessing the effects of particular policies. The great strength of the IARU collaboration is that it will enable us to compare existing and planned policies in developed as well as rapidly developing countries where the context differs sharply.

The overall aim is to analyze societal adjustment to the health consequences of demographic ageing so as to develop a framework for assessing the effectiveness of different health and long-term care policy models. This entails:

- assessing how changes in policies, social institutions, and culture articulate and shape the balance of responsibility between families, individuals and the state;
- developing criteria for policy evaluation within a purpose-built comparative framework taking dynamic demographic context into account.

The guiding assumption is that the feasibility and effectiveness of policy in any given country must be assessed on the basis of an analysis of context, specifically: the interaction between demographic trends, formal policy, institutional change, and cultural values. Perceptions of problems and their urgency, policy responses, and policy implementation will differ because of these contextual factors, and policy effectiveness must be judged in terms of a framework that takes these into account.

The Project

A comparative country case study design will be adopted; cases will be selected at an up-coming workshop for IARU partners at Oxford Centre for Ageing. An inter-disciplinary approach allows work at four analytical levels:

Demographic and Epidemiological Context

Understanding of the recent contextual basis for policy will be based on analysis of demographic dynamics (fertility, mortality, migration), intergenerational family structure and factors affecting the availability of informal care, and patterns of longevity and morbidity (informing health and aged care needs). Within countries, geographic, urban/rural, class, and ethnic differences will be captured.

Formal Policies

A framework will be developed for studying what governments are doing – and what society thinks governments should be doing – about the health policy challenges associated with demographic ageing. Is there consensus about the importance and urgency of ageing as a policy issue? For each case, research will identify the kinds of formal policies that exist, their key goals, and the main dimensions along which policy approaches vary (for example: in the degree of integration between policy on health care and policy on ageing in other sectors, such as labour market, housing, social insurance; in distinctions and priorities between health promotion, prevention, and health care). Analysis will assess the tension between the responsibilities of the state, the market, civil society organisations and the family.

Institutional Changes

The above framework will be related to ongoing transformations in state institutions, the market, civil society and the family as the channels through which policy is implemented. How effective is state capacity for planning, implementation and quality control? Is there a trend toward a lower/higher share in state (versus individual-level) funding? How responsive is the market to the demand for new kinds of products and solutions (e.g. new types of insurance for long-term care and disability, international recruitment of careworkers)? How are new and existing social forms (patient support groups, civil society organizations, elder collectives) adjusting to changing needs? How is the family responding to the pressures of demographic change (e.g. spousal care replacing intergenerational care, remittances for elder care) and shaping the demand for policy change?

Cultural Values

Analysis will focus on the perceptions, values and norms that both shape and are shaped by policy and institutional changes. Data will be assembled on changes in the obligations of the 'intergenerational contract'. Is there a trend toward greater individual responsibility for health and self-care, and thus less responsibility on the part of state, family, and civil society? To what extent is the maintenance of health considered a moral issue? We will consider changing notions of social justice: for example whether at the financial level, greater individual responsibility concerns better off people, with focus of state funding shifting toward disadvantaged groups. Is healthy ageing becoming an increasingly important indicator of social inequalities and is there more or less tolerance of social inequality?

Work Plan

Phase I (6 months): Mapping of policy patterns, successes, difficulties. Survey of international studies of ageing and burden of disease. Development of tentative criteria for policy evaluation. Development of framework for comparative analysis of demographic context, formal policy responses, institutional configurations and cultural context factors. Team of researchers from all participating countries.

Phase II (15 months): Country case studies. Analysis of dynamics of demographic ageing at population and family levels, and of patterns of morbidity, disability and formal/informal care. Policy analysis based on common framework. Individual researchers in each country.

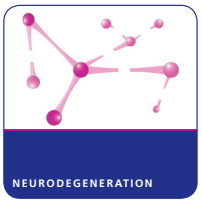
Phase III (9 months): Comparative policy analysis based on case studies. Revision of criteria for assessing policy effectiveness. Multi-national research team.

Phase IV (6 months): Draw conclusions on policy patterns and relevance of institutional and cultural context for policy design and effectiveness. Disseminate results. Produce main report and articles for publication.

Budget	USD
Salaries for individual researchers: case studies 5 x 150,000	750,000
Research expenses 5 x 20,000	100,000
Release time for senior researchers 5 x 60,000	300,000
Contingency	50,000
Total for three years	**1,200,000**

Plan and budget for communication	USD
Preliminary workshop at Oxford Centre for Ageing (funded from other sources)	0
Workshop 1 (planning) at start of Phase I	20,000
Workshop 2 (confirm analytical framework) at end of Phase I	20,000
Study visits between countries during phase II	40,000
Workshop 3 (policy analysis and criteria for assessing effectiveness) at end of Phase III	20,000
Workshop 4 (dissemination of results) at end of Phase IV	30,000
Working papers: writing, copyediting and production – international studies of ageing and burden of disease – demographic trends – policy patterns – institutional changes – cultural values – country case studies – criteria for policy evaluation	17,000
Articles for publication: copyediting	3,000
Total for three years	**150,000**

We expect that an overhead of ca. 25% on average will be needed to complement the above budgets.



Neurodegeneration: The Role of Oxidative Stress

IARU Partners Involved
Australian National University
University of Cambridge
National University of Singapore
University of Copenhagen

Introduction

At the molecular and cellular level studies have shown that oxidative stress is a major cause of neurodegeneration leading to brain ageing, cognitive decline and dementia. DNA damage is produced by the increased presence of molecules carrying reactive oxygen, also commonly known as free radicals. These free radicals can either be produced by our own organism or result from various environmental exposures. Accumulation of DNA damage has a particularly adverse effect on brain cells, leads to neuronal death, and has been linked to Alzheimers Disease (AD) and increased amyloid plaque. The DNA damage response signalling pathway seems to be altered in AD and levels of protein involved in cerebral DNA damage recognition and repair have been shown to be significantly reduced in AD.

This proposal seeks funding for a cutting edge collaborative programme of research focusing on the role of oxidative stress, linking molecular science with epidemiological approaches to develop interventions that may delay or prevent brain ageing. The innovation of this project lies in bringing together research from multiple approaches to increase our understanding of how oxidative stress at the cellular level translates into everyday manifestations of brain ageing, such as memory loss.

There is no available cure for dementia and at present the best approach to fight dementia is prevention. Risk and protective factors of greatest interest in the prevention of dementia are cardio-vascular and pulmonary disease, diabetes, obesity, smoking, alcoholism, exercise, healthy diet, education, and social involvement (e.g., Hulse, Lautenschlager, Tait, & Almeida, 2005; Lautenschlager & Almeida, 2006; e.g., Stampfer, 2006). These factors affect us throughout our lifespan and interventions on these factors are likely to be most beneficial when they occur earlier rather than later in life. Oxidative stress has been proposed as a common pathway for the effects of these risk factors on brain ageing. Until now there has been a lack of stable biomarkers of oxidative stress that can be used in epidemiological studies. However, recent research has identified plasma fluorescent oxidation products as a useful marker of oxidative stress in epidemiological studies (Wu et al., 2007). This means that we are now poised to bring together the enormous resources of epidemiological studies of brain and cognitive decline, with advances in laboratory based research on oxidative stress.

The Project

The following research plans will lead to understanding and intervening in neurodegeneration caused by oxidative stress:

Epidemiology

Blood markers of oxidative stress, neuroimageing markers of brain ageing and cognitive measures will be obtained from well established epidemiologal studies at the ANU and Cambridge. The PATH Through Life study has 7500 participants in three cohorts initially aged 20-24, 40-44 and 60-64 in 1999-2001. Brain scans are available on a subset of the mid and later life cohorts, but this proposal seeks funding to collect and process blood on the 40s and 60s cohorts (n = 5000). The mid-life cohort is especially important and rare because we have scans of this group prior to any substantial neurodegeneration occurring, and hence we will be able to detect changes at ages where interventions are likely to be most beneficial. Our existing longitudinal data base will allow us to confirm whether lifestyle factors are associated with oxidative stress, retrospectively, and brain and cognitive decline, prospectively. Voxel-based morphometry and other automated segmentation techniques will be used to locate brain regions susceptible to OS. In Cambridge existing biological banks link in life trajectories of cognition and function with blood based measures and brain measures. Two studies are available for collaborators. The first is the Cambridge City over 75 Cohort (CC75C) and the second the MRC Cognitive Function and Ageing (CFAS I) Studies.

Molecular and Physiology

The molecular aspect of the project will be conducted at the University of Copenhagen and NUS, focussing on cellular mechanisms that contribute to age-related and neurodegenerative disorders. This includes the possibilities of AD arising in part from DNA being damaged by oxidative stress, and of inflammation underlying age-related macular degeneration. Investigations will involve assessment of protein, DNA and lipid oxidation in AD brain, and an analysis of damage signalling and DNA repair pathways in AD brain tissue. Complementary investigations will be undertaken using primary cell lines and mouse models. Animal models will also be used for investigations that focus on neuroimageing studies of the role of oxidative stress in neurodegeneration. Two-photon microscopy will be carried out in vivo of defined neuronal networks with special regards to neuronal signaling, information processing and local oxygen consumption. These measurements will be carried out for 3 ages in normal rodents and in double and triple knockout mouse models mimicking alzheimers diseases or deficient in DNA repair. These studies will then be related to molecular analysis.

Mitochondria are the gatekeepers of the life and death of most cells in the body and control metabolism and hence energy production needed to carry out work. Mitochondrial dysfunction is implicated in a range of human diseases including ageing and neurodegenerative diseases. We propose to quantify the dynamics of mitochondrial DNA in neurodegeneration. Transgenic mice will be developed and examined for mitochondrial function and genome stability. In vivo studies of mtDNA repair are performed on mammalian cells in culture and detailed in vitro studies are performed on mitochondria isolated from mouse tissues. We also generate synaptosomes whereby activity of synaptic versus non-synaptic mitochondria can be measured.

Further, blood flow, metabolism and network activity will be studied in vivo. The cerebellar and cerebral cortices will be investigated in rodents in vivo using electrophysiological techniques. This is combined with electrochemically recorded oxygen consumption, assessment of local blood flow and estimates of local oxygen and glucose consumption.

Piloting of interventions

The longer term goal of the IARU collaboration is to develop interventions to prevent age associated neurodegeneration. Funding is sought at this first stage to design and pilot a RCT study involving physical activity, folate and aspirin, to determine whether reduction in oxidative stress and slowing of neurodegeneration can be achieved (using MRI, blood and behavioural measures). In addition, transgenic animal models of age-related, neurodegenerative disorders and deficiencies in DNA repair will be used to study the basis of oxidative stress. Highlighting the importance of this project covering wide-ranging levels of investigation, it is possible that population-based environmental or behavioural interventions (like physical exercise) influence both cellular or molecular mechanisms and the development of age-related and neurodegenerative disorders. Mouse models with specific enhancements or defects in DNA repair will be studied with molecular and imaging approaches in relation to preventing the development of neurodegeneration.

Existing data sources

IARU epidemiological and biological datasets for potential analysis are worth several million dollars. The project will therefore build on this existing resource to add value to long term investments by IARU universities in this field. It will enable collaborations that will ensure that we retain our position as leading universities in terms of research infrastructure, capacity and innovation.

Budget USD

Year	Epidemiology		Molecular	Total
	Australian National University (ANU)	University of Cambridge	University of Copenhagen	
2008	130,000	130,000	200,000	460,000
2009	130,000	130,000	200,000	460,000
2010	80,000	-	200,000	280,000
Total for three years				**1,200,000**

Epidemiological studies: The Australian National University and the University of Cambridge both receive USD 130,000 in 2008 and 2009 to conduct blood collection and analysis of markers of oxidative stress (plasma fluorescent products) on subsamples of participants with MRIs in their longitudinal studies. The Australian National University receives USD 80,000 to develop proposal and conduct pilot work for intervention study, collaboratively with the University of Cambridge, National University of Singapore, and the University of Copenhagen.

Molecular studies: The funding (USD 600,000) will be used for one postdoctoral fellow and two technicians to be positioned at the University of Copenhagen, as well as consumables. The fellow will spend 6 months at the National Institutes on Ageing, USA to learn the molecular techniques and foster interactions and collaborations.

Plan and budget for communication	USD
Travel for research: 4 meetings among collaborating institutions (4 visits over 3 years x 5 scientists) x USD 5,000	100,000
Administration support for collaboration involving website maintenance, assisting with travel arrangements, grant management, email bulletins etc. USD 10,000 x 3 years	30,000
Postdoctoral exchange fellowships	20,000
Total for three years	**150,000**

We expect that an overhead of ca. 25% on average will be needed to complement the above budgets.

Evolutionary Medicine

IARU Partners Involved
ETH Zürich
University of California, Berkeley
University of Cambridge
University of Copenhagen
University of Oxford
Yale University

Introduction

Humans, pathogens and vectors that transmit diseases share a co-evolutionary history of dynamic interactions with significant ongoing implications for human health. While Evolutionary Medicine has identified the fundamental and applied research questions that most urgently need answers, there are remarkably few interdisciplinary research programs that span biology and medicine and address these questions in a coherent conceptual framework. The program proposed here aims to establish the first world-wide research and training program in Evolutionary Medicine and to set the agenda for this rapidly developing field.

Evolutionary Medicine is a field that requires interactions among theoreticians and experimentalists, geneticists and evolutionary biologists, and ecologists and epidemiologists (see e.g. http://evolutionandmedicine.org/). The 23 faculty at the six IARU universities plus one non-IARU professor who support this initiative form a critical mass of international expertise. The Departments and Research Centres that they represent cover all relevant disciplines: genomics, antigenics, and bioinformatics; life-history and experimental studies of bacterial, viral, protozoan and fungal evolution; population genetics, spatial ecology and demography; and epidemiology of human and animal model systems. They are strong in both theoretical and experimental approaches, but the kinds of theoretical strength – in analytical models, in statistics, in computation – and the kinds of experimental systems – viruses, bacteria, other microparasites, and various hosts, including humans – differ among them, thus providing broad and complementary sets of skills.

The Project

We have agreed to focus our efforts on the epidemiology and evolution of directly transmitted and vector-borne diseases. Given the need for recruitment of junior Faculty in Evolutionary Medicine worldwide, we propose a three-year Research-Training Network similar to the European (EU) Marie Curie Research Training Networks. The Faculty involved in this initiative have strong track records of training young researchers. We envisage 6 postdoctoral positions of 2-2.5 years each and three joint workshops at which the postdoctoral fellows, the supervising Faculty, and selected PhD students will meet to exchange research results through talks, posters and round table discussions and to receive and disseminate focused training in central topics of joint interest via invited guest speakers and hands-on assignments. We plan to advertise the postdoctoral positions jointly; they are defined to fit the particular research and training strengths of the different groups. 2-4 Faculty will normally support each postdoc position, either in a joint effort at a single University or across 2-3 different Universities:

Project 1 – Berkeley

Evolution of HIV and *Mycobacterium tuberculosis* in the current AIDS-TB co-pandemic with implications for designing treatment regimens: A quantitative approach fitting differential equation model parameters to southern and east African data

The Berkeley Group is particularly interested in the evolution of pathogenicity and drug resistance of viral and bacterial pathogens, with an emphasis on HIV and tuberculosis (TB) epidemiology. A third of the world's human population is infected with *Mycobacterium tuberculosis*, the causal agent of TB. This disease has a major impact on the quality of life and longevity in those it afflicts, and is a deadly opportunistic infection in immuno-suppressed persons. A major research focus for the Berkeley group will be on how: (i) different drug regimens and public health programs drive the emergence, fitness, and transmissibility of TB and HIV drug resistant strains, and (ii) HIV-TB co-epidemiology impacts strain evolution of the two pathogens. More

specifically, the Berkeley group will investigate how the type and frequency of different TB and HIV strains, with different epidemiological and clinical features, is changing temporally and spatially given the dramatic reemergence of TB worldwide. The group will compare TB-HIV genetic co-epidemiology in areas with generalized and concentrated HIV epidemics, particularly sub-Saharan Africa. This research will entail implementing and developing proper statistical methods for the analysis of both the within-host molecular evolution and between-host epidemiological data. It will also build on collaborations that have already been developed with scientists working on both the HIV and modern TB pandemic including scientists at WHO, Geneva (e.g. Brian Williams), the South African Centre for Epidemiological Modelling and Analysis, Stellenbosch, South Africa (e,g. John Hargrove) and several medical doctors at the University of California, San Francisco.

Project 2 – Cambridge

Antigenic and genetic coevolution of Influenza A with the human immune response (data driven), and the coevolution of humans and disease

Antigenically variable pathogens are the primary cause of infectious disease morbidity and mortality worldwide due to their ability to escape from immunity induced by prior infection or vaccination, and to become resistant to drugs. Influenza is an important pathogen in its own right, infecting 5-15% of the world's population each year and estimated to cost the US economy alone 100 billion dollars per year. Influenza is also an excellent model system for studying antigenically variable pathogens as there is a wealth of surveillance data collected from around the world, and the virus is easy to manipulate in the laboratory. We will focus on both the antigenic and genetic coevolution of the pathogen with the human immune response, and the coevolution of humans and disease.

Project 3 – Copenhagen

Adhesive antigen arms races between Malaria and human hosts: Molecular co-evolution in an ecological context

Humans and their malaria parasites are almost certainly engaged in an evolutionary arms race involving the antigens used to mediate adhesion of infected erythrocytes to vascular host receptors (to avoid their splenic clearance) and the antibody response to these antigens. The co-evolution of malaria strains, their mosquito vectors and human hosts is further affected by geographical distribution patterns that determine the mosaic of selection forces affecting the parasite-vector-host interactions. The evolutionary aspects of parasite adhesive antigens have not been much studied so far and provide excellent opportunities for interdisciplinary work involving molecular population genetics, evolutionary biology and macro-ecological approaches.

Project 4 – Oxford

Population genetic modelling of antigenic and genetic evolution of Influenza A (theory-driven)

Human influenza viruses – of which type A is the most virulent – infect 3-5 million people worldwide each year, resulting in more than 250000 deaths. It is now clear that the continual antigenic change of influenza A, which enables the virus to evade host immune responses, results from a complex and poorly-understood interplay of genetic and epidemiological processes. Although genomic and immunological data are abundant, there is a critical lack of quantitative models for data analysis. This project will develop an innovative population genetic model to analyse the joint antigenic and genetic evolution of influenza A. The model will be based on "strong selection" coalescent theory and will incorporate viral population structure arising from both geography and antigenic type. As previously demonstrated, such models can be implemented in a statistical inference framework in order to estimate key parameters from empirical genetic data. We will investigate, for the first time, parameters such as the ratio of antigenic to genetic change, local effective population sizes, and lineage migration rates, and thereby begin to build a rigorous quantitative understanding of influenza A behaviour.

Project 5 – Yale

The ecology and evolution of vector-borne diseases using experimental and modelling approaches

We will study the ecology and evolution of vector-borne diseases using a combination of field work, mathematical models, and laboratory experiments to further illuminate the basic principles governing the transmission, distribution, and virulence of this important class of diseases, which includes malaria, dengue fever, yellow fever, West Nile virus, Lyme disease, and sleeping sickness.

Project 6 – Zürich

Causes and consequences of stochastic phenotypic variation during bacterial pathogenesis: Combining experimental evolution and mathematical models with molecular techniques

Clonal populations of bacteria living in homogenous environment often exhibit substantial phenotypic variation between cells, as a consequence of stochastic processes during gene expression and development. Such stochastic phenotypic variation could play a substantial role in bacterial pathogenesis; it could increase the long-term persistence of bacterial genotypes challenged by the host's immune system and by antibiotic treatment. We propose to use a combination of experimental evolution, theoretical models, and molecular analysis to investigate the causes and consequences of stochastic phenotypic variation during bacterial pathogenesis. This project has the potential to provide new insights into the role of chance during pathogenesis, and produce results that are relevant for applied questions.

Budget – USD 1,200,000 for three years								USD
	Berkeley	Cambridge	Copenhagen	Zürich	Oxford	Yale	Michigan	**Total**
Postdoc salary	140,000	160,000	165,000	165,000	160,000	140,000	-	930,000
Consumables	25,000	25,000	25,000	25,000	25,000	25,000	-	150,000
Workshops	-	40,000	40,000	-	-	40,000	-	120,000
Total	165,000	225,000	230,000	190,000	185,000	205,000	-	**1,200,000**

Travel expenses are in the "Plan and budget for communication"; see below.

Plan and budget for communication	USD
Workshop 2008 (Copenhagen): Assuming 6 delegates each (4 Faculty, 1 postdoc, 1 PhD student) for University of California, Berkeley; University of Cambridge; University of Copenhagen; ETH Zurich; University of Oxford; Yale University + 2 Ann Arbor we get: 14 x 1300 (USA) + 24 x 500 (IntraEuropean) = USD 30,200 This funding has already been secured via a grant by the Danish National Research Foundation and the Copenhagen IARU Fund.	0
Workshop 2009 (Yale): Assuming 6 delegates each for University of California, Berkeley; University of Cambridge; University of Copenhagen; ETH Zurich; University of Oxford; Yale University + 2 Ann Arbor we get ca: 14 x 500 (USA) + 24 x 1,300 (IntraEuropean)	39,000
Workshop 2010 (Cambridge): Assuming 6 delegates each for University of California, Berkeley; University of Cambridge; University of Copenhagen; ETH Zurich; University of Oxford; Yale University + 2 Ann Arbor we get ca: 14 x 1,400 (USA) + 24 x 550 (IntraEuropean)	33,000
Establish a website on a Copenhagen server and pay someone to maintain it. (5000 per year for 3 years)	20,000
Promotion of Evolutionary Medicine via Internships etc (6,000 to each of the IARU Universities)	36,000
Society for Evolutionary Medicine: A small workshop and/or seed money to found this new Society in 2009	22,000
Total for three years	**150,000**

We expect that an overhead of ca. 25% on average will be needed to complement the above budgets.

Appendix 1

Researchers Involved

Health Policy Challenges of Ageing Populations

Associate Professor Heather Booth
Australian National University
Research field: Demography, longitudinal later-life-course studies, demographic modelling and forecasting.
Web: demography.anu.edu.au/People/staff/heather.php

Associate Professor Angelique Chan
National University of Singapore

Professor Finn Diderichsen
University of Copenhagen

Professor Sarah Harper
University of Oxford
Research field: Social gerontology
Web: www.ageing.ox.ac.uk

Senior Research Fellow Kenneth Howse
University of Oxford
Web: www.ageing.ox.ac.uk

Associate Professor Karsten Vrangbaek
University of Copenhagen
Research Field: Public administration, health policy and management
Web: www.polsci.ku.dk/

Professor Lihua Pang
Peking University
Research field: Population Economics

Dr. Agnes Walker
Australian National University
Research field: Health economics
Web: www.acerh.edu.au

Professor Susan Whyte
University of Copenhagen
Research field: Social and medical anthropology
Web: antropologi.ku.dk/ansatte/vip/susanwhyte/

Dr. Lei Zhang
Peking University
Research field: Population health and management

Dr. Zhongwei Zhao
Australian National University
Research field: Demography, mortality in East Asia
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Professor and Director Xiaoying Zheng
Peking University
Research field: Population, environment and health

Neurodegeneration: The Role of Oxidative Stress

Dr Walter Abhayaratna
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Research field: Cardiology, noninvasive cardiovascular imaging, population health
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Australian National University
Research field: Cognition, depression, dementia, longitudinal methods, driving, mobility
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Associate Professor Kirsten Avlund
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Research field: Disability, fatigue, preventive home visits
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Professor Vilhelm Bohr
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Research field: Neurodegeneration
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Research field: Genetics
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Professor Barry Halliwell
National University of Singapore
Research field: Antioxidants and free radicals

Professor Martin Lauritzen
University of Copenhagen
Research field: Clinical neurobiology and functional neuroimaging, experimental neurology and psychiatry, translational neurobiology
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Associate Professor Milena Penkowa
University of Copenhagen
Research field: Neuroprotection, inflammation, neuroregeneration
Web: www.neuroprotection.dk
www.metallothionein.com/Metallothionein/Metallothionein.html

Dr Timothy Windsor
Australian National University
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Outside IARU:
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Denmarks Technical University

Associate Professor Tinna Stevnsner
Aarhus University

Evolutionary Medicine

Project 1
∗ *Professor Wayne Getz,*
University of California, Berkeley
Research field: Disease ecology and evolution, HIV, tuberculosis
Web: www.cnr.berkeley.edu/~getz/

Professor Nick Jewell
University of California, Berkeley:
Research Field: Disease modelling, data analysis
Web: works.bepress.com/nicholas_jewell/

Professor Montgomery Slatkin
University of California, Berkeley
Research Field: Human genetic diseases and resistance
Web: ib.berkeley.edu/labs/slatkin/monty/monty.html

Project 2
Dr. François Balloux
University of Cambridge
Research field: Geography of resistance to hepatitis B
Web: www.gen.cam.ac.uk/Research/balloux.htm

Dr. Andrea Manica
University of Cambridge
Research field: Evolution of preindustrial humans
Web: www.zoo.cam.ac.uk/zoostaff/manica.html

∗ *Professor Derek Smith*
University of Cambridge
Research Field: Antigenic cartography, influenza
Web: www.antigenic-cartography.org

Project 3
∗ *Professor Jacobus J. (Koos) Boomsma*
University of Copenhagen
Research field: Social evolution, coevolution, symbiosis
Web: www.bi.ku.dk/staff/jjb

Professor Lars Hviid
University of Copenhagen
Research field: Malaria, immunology, parasitology, drug resistance, vaccine development
Web: www.cmp.dk

Professor Rasmus Nielsen
University of Copenhagen
Research Field: Statistical and computational methods, population genetics, phylogenetics
Web: www.evolutionarygenomics.dk/

Professor Carsten Rahbek
University of Copenhagen
Research field: Climate change modeling, biodiversity, conservation
Web: www.bi.ku.dk/staff/crahbek

Professor Niels Tommerup
University of Copenhagen
Research field: Genomics, disease-associated translocation--breakpoints
Web: www.wjc.ku.dk/staff/index.php?subpage=details&login=tommerup

Project 4

✶ *Professor Peter Donnelly*
University of Oxford
Research field: Statistical inference of gene function
Web: www.stats.ox.ac.uk/people/donnelly/cv.htm

Dr. Sunetra Gupta
University of Oxford
Research field: Evolution of pathogen diversity: malaria, dengue
Web: www.emdis.ox.ac.uk/people/sunetra_gupta.shtml

Professor Angela McLean
University of Oxford
Research field: Modelling the evolution and spread of pathogens
Web: www.emdis.ox.ac.uk/people/angela_mclean.shtml

Dr. Oliver Pybus
University of Oxford
Research field: Virus evolution
Web: evolve.zoo.ox.ac.uk/people.html?id=pybuso

Project 5

Professor Durland Fish
Yale University
Research field: Vector ecology, Lyme disease, West Nile virus
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Professor Alison Galvani
Yale University
Research field: Models, SARS, HIV, influenza
Web: info.med.yale.edu/eph/faculty/galvani.html

✶ *Professor Stephen Stearns*
Yale University
Research field: Evolutionary medicine, ageing, life histories
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Professor Paul Turner
Yale University
Research field: Experimental evolution, viruses, bacteria
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Project 6

✶ *Professor Martin Ackermann*
ETH Zürich
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Professor Sebastian Bonhoeffer
ETH Zürich
Research field: Dynamics of viral infections
Web: www.tb.ethz.ch/people/sbonhoef

Professor Jukka Jokel
ETH Zürich
Research field: Hosts, pathogens, and sex
Web: www.igw.ethz.ch/p21.html

Professor Paul Schmid-Hempel
ETH Zürich
Research field: Insect societies and their pathogens
Web: www.eco.ethz.ch/people/head/paulsch

✶ = Faculty taking prime responsibility for post doc programs.

Outside IARU

Professor Randolph M. Nesse
Research Center for Group Dynamics, ISR, and Director, Evolution and Human Adaptation Program, University of Michigan, Ann Arbor: Evolutionary medicine, psychiatry, psychology
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Appendix 2

Potential Funding Sources

Health Policy Challenges of Ageing Populations

National and international research funding agencies and other major foundations supporting health research such as:

- In Denmark: University research funds, national research councils, the Board of Social Affairs (Socialstyrelsen), private funds.
- In China: The National Social Science Foundation, university stipends.
- In Australia: The Australian Research Council.
- EU funding
- In the United States of America: The US National Institute on Ageing, The Wellcome Trust.

Neurodegeneration: The Role of Oxidative Stress

- In the United States of America: National Institute of Health, National Science Foundation, Gates Foundation;
- In Australia: National Health and Medical Research Council, Australian Research Council;
- In Singapore: Singapore National Grants
- In the European Union: Marie Curie Conferences, Marie Curie Fellowship, European Research Council

Evolutionary Medicine

The major public and private funding agencies in the countries concerned, including:

- In the United States of America: the NIH, the NSF, and the Gates Foundation;
- In Switzerland: the SNF and the Roche and Novartis Research Foundations;
- In Denmark: The National Research Councils and the National Research Foundation;
- In The United Kingdom: The Welcome Trust, BBRSC, MRC and NERC.
- This consortium would be an attractive platform to apply for EU-Marie Curie Networking activities, EU-Marie Curie Conferences and the EU Marie Curie individual postdoc fellowship program (IntraEuropean, Incoming and Outgoing Marie Curie fellowships).
- In the longer run, the consortium would also be competitive for research funding from the thematic research programs of EU and for the career development fellowships of the newly established European Research Council.

SO2.3 Energy, Resources and Environment

Toward Sustainable Cities: a Comparative International Study

IARU Workshop on Energy, Resources and Environment
Research Collaboration "Transformation towards Sustainability"
Research Proposal: Toward Sustainable Cities: A Comparative International Study

1. Past Developments and Future Plans

At the end of January 2007, The University of Tokyo (UT) held an IARU workshop on "Energy, Resources and Environment (ERE)" at its campus, and developed a proposal with the National University of Singapore (NUS) and ETH-Zurich (ETH) for IARU collaborative research under the theme of "Transformation toward Sustainability."

The resulting proposal was taken up at the IARU Presidents' Meeting held in March at the Australian National University (ANU), where it received approval to proceed to the next stages of development. The three lead universities were instructed to put together a more detailed proposal[1] for consideration at the Senior Officers' Meeting in September, and set the end of July as the target for an initial draft. (A decision was made to treat separately the proposal submitted at the same time for an International Symposium on Sustainability Science [ISSS], where the research findings of ERE project(s) can be presented, evaluated, and disseminated. UT, NUS, and ETH were charged with raising the initial external funds.)

In May, UT sent a draft proposal for focusing on three specific research areas—(1) land use and ecosystem functions; (2) food systems and water resources; and (3) energy and environment—to NUS, ETH, ANU, and the University of Copenhagen (UoC), and requested that any comments be returned by June 20. NUS responded in support of the sustainable cities research outlined below.

UoC responded by noting some areas included in the long-term framework that needed to be

1 The IARU Presidents' Meeting in March 2007 issued the following requirements for proposals:
- a coherent and focused research proposal — which should contain three elements:
  - a longer term framework that identifies the big issues and how they should be addressed
  - a short term project where progress can be made quickly (within the context of the longer term framework) — perhaps focused on the comparative elements of each project;
  - a timetable with specific milestones
- identification of researchers or research groups at other IARU universities prepared to commit to involvement in the research
- a realistic budget with defensible costings, covering approximately 3-5 years
- a funding plan that details sources of funding (but does not go as far as contacting external funding bodies)

reflected in the short-term projects, such as urban-rural integrated impacts and land use changes, as well as noting the need to add cross-cutting topics such as ecosystem functions and the provision of ecosystem services to humans. ANU seconded UoC's response. The proposal was revised accordingly and was resent to member universities for further comments. NUS, UCB and ANU have responded.

The present document has reflected these comments and inputs, and is a final draft of the proposal to be submitted to the Senior Officers' Meeting in September. The Meeting will discuss this and other research proposals and make recommendations to the IARU Chair. The Chair will in turn contact the leaders of each project regarding any changes that need to be made and ask that they return revised proposals by the end of October. After further review, the Chair will establish a coherent IARU plan to ensure funding bodies are not approached multiple times and submit the proposals to national and international funding agencies early in 2008.

2. Outline of the Collaborative Research Project

2.1. The Objectives of the Project

(1) To collaborate on research that will position IARU partners as leaders in the fields that address global change and sustainability issues.

(2) To take up the many challenges that global sustainability presents and produce new knowledge more quickly through a trans-university approach among the IARU institutions

2.2. Specific Research Areas

(1) Land use and ecosystem functions
   1) Urban and rural development interaction, synergies and conflicts
   2) Land use changes in a spatially explicit framework

(2) Food systems and water resources
   1) Appropriate water usage
   2) Sustainable consumption and production
   3) Nutrient conservation and soil conservation

(3) Energy and environment
   1) Energy and material flows
   2) Anthropogenic effects on natural cycles
   3) Food and bio-energy

2.3. Long-Term Framework

The long-term aim is to study the challenges of achieving global sustainability, along with potential solutions, through research in the three related areas outlined above, not only on a category-by category basis but from cross-cutting perspectives as well, and to develop a comprehensive, overarching vision as well as specific policy recommendations on a continuing basis.

2.4. Short-Term Framework

(1) Individual proposals should satisfy the project criteria indicated below. Within the above three areas identified as needing attention over the long term, we believe it will be most productive to begin by focusing research collaborations on urban sustainability issues. By studying individual cities in or near which they reside and comparing notes with others who do the same, IARU member institutions can contribute valuable new knowledge toward achieving global sustainability. Details are offered below for a collaborative research plan that includes exactly such comparative analysis.

(2) Project Criteria

1) Research that fosters collaborative efforts among IARU members
2) Research that enhances mutual understanding among IARU members
3) Research that makes optimal use of IARU member strengths and thereby shows the greatest promise of success

3. Proposal for "Towards Sustainable Cities: A Comparative International Study"

1. Cities are high-density living spaces where more than half the human population of the world is concentrated today. They have become a serious threat to sustainability in the 21st century owing to their high consumption of resources and energy as well as the burdens they place on the natural environment.

   According to United Nations estimates[2], 3.2 billion people lived in cities in 2005, and by 2030 this number is projected to rise to 4.9 billion, or 60% of the world's total population. In 2005 there were 20 megacities with populations of over 10 million around the world; by 2015 this number is expected to rise to 22, seventeen of which will be located in developing countries. The megacities located in developed countries where most IARU members are situated, such as Tokyo, New York and Los Angeles, are expected to experience moderate increases in population, while Beijing, as one of the megacities of the developing world, is projected to grow more rapidly in the coming years.

   Clearly, then, pursuing sustainability in the cities, where most of the world's population will live and work in the future, is a vital part of developing sustainability strategies for the globe as a whole. Indeed, Agenda 21, Chapter 7, "Promoting Sustainable Human Settlement Development," states that its objective is "to ensure sustainable management of all urban settlements."

   Both the UN's Millennium Development Goals and the Johannesburg Plan of Implementation adopted at the World Summit on Sustainable Development call for significant improvements in living conditions for slum dwellers (the urban poor) as part of an overall poverty eradication program, and see this as an important step toward achieving sustainable cities.

2 World Urbanization Prospects, The 2005 Revision (UN website: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

2. At the same time, all cities spread their wings locally, and differences in terms of natural environment, history, and culture create uniqueness and diversity among them. For this reason, research on cities, including on environmental factors, has in the past focused primarily on each city's individual characteristics, and the discussion of solutions to city problems have mainly taken a case-by-case approach as well.

   For example, the city-specific approach to solutions can be seen in both the Local Agenda 21 action plans formulated by local government bodies in order to achieve the sustainable development goals of Agenda 21, which was adopted at the Earth Summit in Rio de Janeiro; and in the Cities for Climate Protection (CCP) campaign of the International Council on Local Environmental Initiatives (ICLEI[3]), which helps cities implement quantifiable measures to reduce local greenhouse gas emissions as well as other policies to enhance urban sustainability.[4]

   The same can be said with regard to Japan's Kitakyushu Initiative for a Clean Environment,[5] a program of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), which aims to enhance the capacity of cities in the region to manage their urban environments. Successes are analyzed for how they might be adapted to other cities in order to help solve environmental problems there, in what is essentially a city-by-city approach.

3. However, in order to link the efforts toward sustainability at the city-by-city level to a global sustainability strategy, new studies are needed to compare the research that has been done on individual cities, and to highlight both the common elements that extend across all cities and the unique elements that are specific to individual cities. Particularly valuable in this regard will be studies that throw light on the common and unique elements by using uniform indicators (see note) to compare the sustainability of cities from the perspectives of energy, resources and environment.[6]

4. The IARU member institutions are located in or near major cities in North America, Asia, Oceania, and Europe (see Table 1), where the consumption of resources and energy is very high. To have member institutions examine the major cities in or near which they are located using uniform sustainability indicators and then hold workshops with other member institutions to pool results and discuss international comparisons is without question an endeavor well worthy of promotion as an IARU research project.

5. The basic methodology of the proposed project will be as follows: First, in consideration of the research areas stipulated by IARU/ERE, indicators that can be used to measure and compare the sustainability of large cities will be divided into the three groups of (1) energy

3 ICLEI website: http://www.iclei.org/index.php?id=800

4 ICLEI has also developed uniform guidelines and tools such as the Harmonized Emission Analysis Tool (HEAT) to assist all local governments in reducing greenhouse gasses through sound economic development, energy savings, and appropriate waste management.

5 IGES website: http://www.iges.or.jp/kitakyushu/index.html

6 The Human Development Index (HDI) of the United Nations Development Program (UNDP) may be noted as a successful example of applying a uniform indicator of this kind. The index provides a composite measure of three basic dimensions of human development: (1) a long and healthy life, as measured by life expectancy at birth; (2) knowledge, as measured by the adult literacy rate and the combined primary, secondary, and tertiary gross enrollment ratio; and (3) a decent standard of living, as measured by the log of gross domestic product per capita at purchasing power parity in US Dollars. It should be further noted, however, that this index does not measure the existence of inequalities, nor take into account difficult to measure factors such as human rights and political and intellectual freedoms, and it is therefore not a truly comprehensive index of all aspects of human development, but aimed rather at obtaining a broad, multi-dimensional measure of the degree of advancement, income levels, and quality of life.

and global warming, (2) material flows, including food and water, and (3) land use and ecosystem functions. The situation in each city will then be evaluated objectively using these sustainability indicators and the results compared. Complex indicators, which can be developed by integrating indicators in each category, could also be used for the analysis, taking into accout e.g. the need to preserve ecosystems, provide food, and in the future, use some land for biofuels. Finally, common goals as well as city-specific individual goals will be established for achieving sustainable cities, and the backcasting methodology will be used to study paths for attaining those goals.

As a foundation component of the comparison study, issues of city boundaries and geographical limits, population size (e.g., residents, visitors, transient workers etc), industry infrastructure, regional resources and government infrastructure, on which numerous indices will be based, will be developed on a consolidated format. Furthermore, critical discussions of growth and expansion forecasts, population characteristics, educational infrastructure, and air, land, water resources will be carried out as an integral part of the foundation of the study at workshops.

6. In the energy and global warming group, the project will build on discussions that have come out of the Intergovernmental Panel on Climate Change (IPCC) and other relevant forums as it gathers data for each city regarding total energy consumption, the adoption rate for renewable energy sources, the percentage of dependence on different energy sources, levels of atmospheric pollutants, total greenhouse gas emissions, and so forth. This data will then be used as the basis for understanding each city's energy consumption level and the burdens it places on the atmosphere and environment, as well as to derive city-to-city comparisons of sustainability. Further, by backcasting from the drastic CO2 reduction targets Tokyo and other major cities have set for 2050[7], commonalities and differences among cities in the transformation to low-carbon societies will be brought to light.

   For example, the IPCC National Greenhouse Gas Inventories Program[8] has set uniform guidelines for countries to calculate their overall greenhouse gas emissions, and by using those guidelines to compile inventories on a city-by-city basis, the project can place each university and each city on a common foundation. Taking that as its starting point, the project will study the aforementioned indicators. Further, through the collaborative aspects of the research, new indicators can be developed that take into account the individual characteristics of the cities, thereby expanding the energy indicators available for researchers to use.

   As part of its cooperation with the Tokyo Metropolitan Government to implement the Tokyo Half Project (THP) aimed at reducing greenhouse gasses by half, UT has been researching strategies for curbing emissions from transportation, construction, and power generation, and the fruits of these efforts will be available for the present project to draw on as well. Also of interest will be the findings of the Urban Environment Control Project (UECP) of the Institute

7 In the interim report on its Basic Environmental Plan, the Tokyo Metropolitan Government declares as a desirable goal for 2050 a reduction in the emission of green house gasses by at least 50% from present levels, and as a midterm goal it sets a target for 2020 of a 25% reduction from 2000 levels. Emission targets adopted elsewhere include a reduction of 60% from 1990 levels by 2025 in London; a reduction of 30% from 2005 levels by 2030 in New York City; and a reduction of 80% from 1990 levels by 2050 in the State of California. (See Table 1; also see Tokyo Metropolitan Government Basic Environmental Plan Progress Report Draft, May 2007[in Japanese] http://www2.kankyo.metro.tokyo.jp/kikaku/singikai/kikaku/070531bukai/siryou1-bukai-070531.pdf)

8 IPCC/NGGIP website: http://www.ipcc-nggip.iges.or.jp/

for Global Environmental Strategies (IGES)[9], which conducted studies on transportation and solid waste management and considered strategies for curbing greenhouse gasses in Asian cities.

7. In the material flows group, the project will build on discussions that have come out of the Organisation for Economic Co-operation and Development (OECD) and other bodies in considering the appropriate indicators for tracking resource productivity and the flow of materials such as fossil fuels, metals, and minerals within the city. These indicators will then be used to gain an understanding of the situation in each city and to make comparisons among them. Further, in light of the "3Rs Initiative" (Reduce, Reuse, Recycle) being promoted internationally since it was approved at the G8 Sea Island Summit in order to encourage the efficient use of resources and materials, the project will set 3Rs Initiative–based city-by-city targets for reductions in resource use and waste output as well as similar targets for increases in recycling and reuse rates, and then use backcasting to determine how those targets can be achieved and to cast light on the commonalities and differences among cities in the strategies necessary for building a resource-circulating society.

   In 2004, the OECD Council adopted a recommendation on material flows and resource productivity[10] that calls for member nations to work toward improving data collection and handling with regard to material flows, as well as to develop tools for evaluating material flows, including appropriate indicators. Further, joint research efforts have been moving forward since that time, and an international workshop to review the various countries' undertakings is scheduled to be held in Tokyo in September 2007.

   There are other clear signs of international engagement in this area: a document entitled "Global Energy Security"[11] produced at the G8 Summit last year addresses the setting of international targets for resource productivity[12]; and both the EU and UN Environment Programme (UNEP) have established international panels on the sustainable use of natural resources.

   However, these efforts are primarily directed at analyzing material flows and resource productivity at the national level, and additional investigation and study are needed before the data can be broken down to the city level. Further, studies that don't merely look at the weight of the materials but instead weight the environmental impact in an integrated manner, such as through a life cycle assessment (LCA), remain in progress and still require examination.

8. In the land use and ecosystem functions group, the project will build on discussions that have come out of the International Geosphere-Biosphere Programme (IGBP) and the International Human Dimensions Programme on Global Environmental Change (IHDP in examining the areal extents of urban vs. rural land usage in order better to grasp the current state of urbanization. A uniform method will be applied in using GIS and other systems to analyze satellite imagery taken by the same satellite at the same resolution. In particular, with an

9 http://www.iges.or.jp/en/pub/phase2_report_summary.html#UE
10 OECD Council recommendation: http://www.oecd.org/dataoecd/45/53/33763173.pdf
11 G8 2006 Official Website: http://en.g8russia.ru/docs/11.html
12 From "Global Energy Security" (St. Petersburg, July 16, 2006): "19. As part of an integrated approach to the entire resource cycle we reaffirm our commitment to comprehensive measures to optimize the resource cycle within the 3Rs Initiative (Reduce, Reuse, Recycle). In furthering these efforts, we will set targets as appropriate taking account of resource productivity. We will also raise awareness of the importance of energy efficiency and environmental protection through national as well as international efforts."

eye to urban-rural integrated impacts and land use changes as well as to human impacts on biogeochemical cycles, the project will measure the degree of intermingling that is present between rural and urban uses, thereby throwing light on the distinctive characteristics of the compact European city, the sprawling American city, and the Asian city where rural and urban features coexist. By doing so, it will illumine commonalities and differences among cities in the strategies necessary to achieve sustainability through creating cities that blend urban and rural activities by 2050.

In 2006, IGBP/IHDP launched the Global Land Project (GLP) [13]) to measure, model, and understand the coupled human-environmental system. It will focus on the interactions of the people, biota and natural resources at the local and regional levels, examining the dynamics and consequences of land system change and conducting analyses and modeling for land sustainability. (These GLP activities are headed up by Professor Anette Reenberg of the University of Copenhagen Department of Geography.)

9. Finally, the project will compile the findings of the above three lines of investigation and propose a future vision for the sustainable society that fuses three societies into one: a low-carbon society, a resource-circulating society, and an urban-rural integrated society. It will draw clear distinctions between the common sustainability elements that apply to all cities, and the unique sustainability elements that apply only to specific individual cities, and provide a final report of the common and individual strategies available for creating the sustainable city.

   The project will also consider the following cross-cutting issues (as suggested by the University of Copenhagen and Univesity of California Barkley):

   - Ecosystem functions and the provision of ecosystem services to humans (including issues of food, fuel and water resources to meet ecological as well as human needs).
   - Economic and ecological wealth
   - Local and global interactions
   - Dynamic linkages in decision-making

   UT is prepared to take the lead in this final compilation of findings from the comparative studies of the various individual cities.

Chronology and Budget

10. The present project is scheduled to take place over a three year period (see Table 2), and will start operating on a portion of the annual USD100,000- budget each university has earmarked for IARU activities. Further, apart from participant travel and lodging expenses (to be covered by parent institutions as a rule), the costs of holding workshops and such will be borne by the host universities.

    It should be noted however that annual budget of USD100,000 - per university will be a minimum requirement to participate this research collaboration. It has been suggested that the fund would be required in the range of ≥USD$1-2 million per city over a 3 to 5 year period. Though these figures are not supported by detailed estimation yet, we can realistically say that more funds will be required in a significant scale at the later stage of the project.

13 GLP HDP website: http://www.globallandproject.org

During the early phase, each university will supposedly focus on the study on the state of each city. Since there are a reasonably sufficient number of studies completed and/or ongoing on the sustainable cities where the IARU members are located (or nearly situated), it is expected that this collaborative research will make the utmost use of the data/information available from these existing studies. Hence, the research at this stage will not require fund to the extent which should have been needed if the study is to be conducted at full scope. This also means that the amount of fund required for the study will be different among the targeted cities, depending upon the availability of data/information. Under such situation, it would be most practical that each participating university takes responsibility for the fund raising necessary for their study component.

Additional funding would be required, however, at the later phase of the research; i.e., during the comparative analysis and final compilation of the studies on sustainable cities as described in Section 9. In this phase, the global initiative to pursue a project on assessing sustainable cities for all targeted cities should be developed. This approach would require a coordination of activities by IARU consortium, which, by that time, will be well established through the collaborative efforts of participating universities on this research.

To conclude, doing such studies, which involves many major disciplines at each university, in a fully integrated and cross-continent manner among 10 university-group has significant benefits and opportunities for faculty, universities, IARU and cities around the world seeking for sustainability. In other words, the study of this scale, breadth, substance and quality, cannot be performed by others but IARU. With this importance and significance of the study, we believe this research proposal can be appropriately developed as a plan for potential submission to the national/multilateral funding agencies.

Participants

11. IARU member universities

    Researchers/research groups who are willing to participate in this research collaboration are as listed in Appendix 1.

12. In addition to IARU member universities, any university with which a member institution has a research partnership in a relevant field (e.g. Hokkaido University, which has relationships with UT and UoC in the field of land use) may also participate in the present project, subject to the approval of the member universities.

13. The present project and the IARU sustainable campus project headed up by Yale and ANU with student participation are mutually supportive. A university campus is in fact a small city, so the sustainable campus aimed at in that project is effectively in the same position as the sustainable city model that the present project aims to achieve, and we believe both studies should offer lessons that can be applied effectively to the other.

Offering Input to G8, Etc.

14. The subject of the present project is one that is being watched most closely by the international community, and in order to bring awareness of IARU collaborative research activities to a broader global community, we need to be making our findings known through all appropriate forums. Besides the aforementioned IPCC, OECD, and IGBP/IHDP programs, there is also the UN Commission on Sustainable Development (CSD) which conducts periodic reviews of

sustainable development efforts; the G8 Environmental Ministers' Meeting scheduled for May 25-27, 2008; and the Conference of University Presidents tentatively planned in conjunction with the G8 Lake Toya Summit scheduled for July 7-9, 2008—all of which represent opportunities in which we need to report on our findings to date.

Table 1: Likely Subject Cities to be Studied by Member Universities

UNIVERSITY NAME	CITY NAME	COMMENT (FUTURE PROJECTIONS, CURRENT RESEARCH, ETC.)	UNIVERSITY PARTICIPATION STATUS
The University of Tokyo	Tokyo	• The largest megacity in the world, with a population of 35.2 million in 2005; expected to grow to 35.5 million • Located in a developed country, the city can serve as a testing ground for whether information technology can offer solutions to problems of sustainability • The city's Basic Environmental Plan interim report declares as a desirable goal for 2050 a reduction in the emission of green house gasses by at least 50% from present levels, and sets a midterm target for 2020 of a 25% reduction from 2000 levels. • Participating as Alliance for Global Sustainability (AGS) member in Tokyo Half Project to cut greenhouse gas emissions in half	Confirmed
National University of Singapore	Singapore	• As a city-state built on an island, faces the question of how far sustainable development is possible without the surrounding ecosystem other cities rely on; remote relationships with other regions through trade are also very important	Confirmed
ETH-Zurich (Swiss Federal Institute of Technology)	Zurich	• A mid-sized western European city, with a deep historical and cultural heritage that affects planning; an inland city with a strong relationship to its agricultural surroundings	Confirmed
University of Copenhagen	Copenhagen	• Same as above except for being located on the sea • Participating in the planning of the UNFCCC conference in Copenhagen in 2009 in which sustainable resource use will be a theme.. • University of Copenhagen has a particular interest in land use, urban and renewable energy issues.	Confirmed
Australian National Univeristy	Canberra	• A newly built, planned, "experimental" city located in an agricultural region; usability of water resources is a limiting factor	Confirmed

UNIVERSITY NAME	CITY NAME	COMMENT (FUTURE PROJECTIONS, CURRENT RESEARCH, ETC.)	UNIVERSITY PARTICIPATION STATUS
University of California, Berkeley	Los Angeles, San Francisco, **State of California**, and others	• L.A. area population of 12.3 million in 2005 will rise to 13.1 million by 2015, which is a relatively low rate of increase of 0.63%, roughly the same as New York • State of California has targeted an 80% of emission level of 1990 level by 2050 • Megacity on U.S. West Coast with high consumption lifestyle • Global trend-setter	To be contacted by NUS
Yale University	New York and others	• N.Y. area population of 18.7 million in 2005 to rise to 19.9 million by 2015, which is a relatively low rate of increase of 0.6% • Goal of 30% emissions reduction from 2005 by 2030 under the mayor's plan for "A Greener, Greater New York (plaNYC)" (participating in the CCP campaign of ICLEI) • Megacity on U.S. East Coast with high consumption lifestyle • Global trend-setter	Participation requested
University of Oxford	London and others	• Goal of 60% emissions reduction from 1990 by 2025 under the London Climate Change Action Plan (participating in the CCP campaign of ICLEI) • Western European-style megacity with powerful resource, space, and density pressures; international transportation, trade, and financial hub; center of global carbon credits trading system	To be contacted by NUS
University of Cambridge	London and others	• Same as above	Participation requested
Peking University	Beijing	• Population of 10.7 million in 2005 expected to balloon to 12.9 million; one of the most rapidly growing cities in the world, with an average annual growth rate of 1.82% • Faces the question of whether it can leapfrog certain traditional stages of development	Participation requested

Sources: "World Urbanization Prospects, The 2005 Revision" UN website); "Towards a Sustainability Research and Education Framework for IARU" (Will Steffen , ANU, IARU Tokyo Workshop presentation, January, 2007); and "Tokyo Basic Environment Plan Interim Report Draft," May, 2007.

Table 2: Anticipated Project Timetable[14]

DATE	STEP	COMMENT
August, 2007	UT-NUS teleconference UT-Peking University Meeting	UT sent letters requesting participation to Yale and Cambridge Universities Prof. Kazuhiko TAKEUCHI to visit Peking Univ.
	(Prepare project proposal; seek comments from participating institutions; revise proposal based on comments)	
September, 2007	Proposal to be taken up at Senior Officers' Meeting	
December, 2007	Assessment of the IARU Chair	• Decision on whether the project is to be approved • Planning of coordinated IARU approach to funding bodies
Winter, 2008	Workshop to discuss research plans	
	(Recruit participants, prepare for fund-raising, etc.)	
Spring, 2008	Begin collaborative work; establish investigative methodology for comparative study of the various cities and carry out the investigations	Interim results could be reported to the planned Conference of University Presidents to be tentatively planned in Summer 2008 in Japan
Summer, 2009	Workshop to present progress reports and exchange views	
December, 2010	Collect final results; conduct workshop to evaluate the fruits of research and consider follow up	Final results could be presented at the UN Commission on Sustainable Development (CSD) in 2010/2011

14 This period would be extended to 5 years.

Appendix 1 Participants (researchers/research groups)

1. The University of Tokyo

(Energy and Global Warming Group)

- Akimasa Sumi (Prof., Executive Director, Transdisciplinary Initiative for Global Sustainability: TIGS)
- Ai Hiramatsu (Assistant Prof., TIGS)

(Material Flows Group)

- Keisuke Hanaki (Prof., Graduate School of Engineering, and TIGS)
- Ryo Honda (Assistant Prof., TIGS)

(Land use and ecosystem functions group)

- Kazuhiko Takeuchi (Prof., Vice President for International Relations, Deputy Executive Director, Integrated Research System for Sustainability Science: IR3S)
- Yuji Hara (Assistance Prof., TIGS)

(Secretariat)

- Shinichi Arai (Project Researcher, IR3S)
- Mariko Kinai (Senior Academic Staff, IR3S)

Comments and inputs will also be provided from the following groups of policy makers and public administration when requested.

(Ministry of Environment, Japan)

- Ryutaro Yatsu , Councillor, Minister's Secretariat
- Hideto Yoshida, Director General, Waste Management and Recycling Department

(Tokyo Metropolitan Government – Bureau of Environment)

- Teruyuki Ono, Senior Director, Urban and Global Environment Division, Bureau of Environment

2. National University of Singapore

Sam Li (Chemistry),
Liu Wen-Tso (ESE),
Tham Kwok Wai (SDE),
Lee Siew Eang (SDE),
Obbard Jeff (ESE),
Yu Liya (ESE),
Ong Choon Nam (Medicine),
Lee Hian Kee (Chemistry),
Andy Hor (Chemistry),
Sanjay Swarup (Biology),
Chan Eng Soon (CE) and
FM Saunders (NERI/ESE).

3. ETH Zurich (to be added more in October)

Gerhard Schmitt (Architecture and Computer Aided Architectural Design)
Bernd Scholl (spatial planning and development)
Remo Burkhard (Chair for Information Architecture)

4. Australian National University
R. Baker (education for sustainability)
D. Carpenter (campus sustainability)
D. Dumeresq (food flows)
R. Dyball (human ecology)
B. Meehan (campus sustainability)
W. Steffen (ecosystem services; rural-urban linkages)

5. University of Copenhagen
(Land use and ecosystem functions group)
Inputs from UoC will be coordinated through current research networks coordinated by the UoC, 1) LaSyS - Network for Danish Land Systems Research (www.lasys.dk) and 2) the Global Land Project (www.globallandproject.org).
Key institutions and personnel from the University of Copenhagen are:

Department of Geography and Geology
Professor Dr Anette Reenberg (professor, Global Land Project Chair)
Dr Kjeld Rasmussen (associate professor, Natural Resources)
Dr Søren P. Kristensen (associate professor, Rural-Urban Land Use)

Danish Centre for Forest, Landscape and Planning
Professor, dr. Gertrud Jørgensen, professor in Urban Planning with a focus on Sustainable Development and leader of the Centre for Strategic Urban Research (www.byforskning.dk).
Deputy Director, Dr Kjell Nilsson, coordinator of an EU-project: PLUREL: Peri-urban Land Use Relationships - Strategies and Sustainability Assessment Tools for Urban-Rural Linkages (www.plurel.net).

Department of Agricultural Sciences
Dr Jakob Magid (associate professor, Natural Resources)
Professor Dr John R Porter (professor, Agroecology)

(Material Flows Group)
Department of Agricultural Sciences
Professor Lars Stouman-Jensen (professor, Urban-Rural Sustainability)

(Energy and Global Warming Group)
Danish Centre for Forest, Landscape and Planning
Professor Claus Felby

Department of Agricultural Sciences
Professor Dr John R Porter (professor, Agroecology)

6. Peking University (tbd)
Ni Jinren (Prof.)
Li Zhenshan (Prof.)

SO3. ISSS

ISSS is in the fundraising and thus a latency phase. The goal is to obtain commitments for a total of 10 million Euro by the end of this year. The organization of ISSS itself shall start when the fundraising looks successful.

We have contacted several companies and received cautious responses. These indicate we should approach the research responsibles to get their judgement and involvement towards early "ownership".

The strategem of propagating a "grand challenge" and making an international conference cycle respond to it appears attractive. But for involvement of multinational corporations (intellectually and financially), the conference cycle must distinguish itself clearly from existing ones, and the probability for useful results must be significant. Formulating the "grand challenge" is the central, decisive task and must be done jointly with global industrial partners. We had proposed "Intelligent Energy and Resource Use for Future Cities", and will proceed from that.

Meetings with heads of Corporate Research and Development of a few selected companies are being arranged. A report on the fundraising effort is due for 31 December 2007. This will mark the decision point whether to continue with ISSS or to abandon it.

Olaf Kübler, Zurich, September 2007

Philosophy of ISSS

Sustainability means being serious about the future. Provident leaders and decision makers in Japan and Europe responded to over consumption and threatening resource depletion in the 17th, 18th and 19th centuries by introducing measures to restore, manage, and substitute their primary source of building material and fuel. Today, far beyond politics, the economy and the public at large are again increasingly concerned about sustainability - and demand solutions. Global warming gives an illustration.

Sustainability is much more than ecology or climate change. Like the protection of human rights, the consciousness of freedom, and the assurance of justice – all measures of human progress –sustainability is a «good principle» to underscore and guide development in all sectors of human endeavour: economic, political, scientific, social, technological, and cultural.

The International Symposium on Sustainability Science (ISSS) is a forum that aims to put this «good principle» into effect by soliciting, and making public, imaginative, solution minded contributions to the themes where sustainability matters most, i.e., in response to Grand Challenges that confront mankind, such as water and food supply, rural and urban development, transportation and mobility, energy use, and civil infrastructure.

ISSS bonds world-renowned universities like ETH Zurich, National University of Singapore und University of Tokyo with a small circle of eminent globally active companies in their ambition to serve human society in its striving for a truly sustainable future.

To turn the good principle “sustainability” into reality,

- one specific Grand Challenge at a time shall be formulated in a joint effort by the institutions of higher learning and the circle of corporations,
- advertised and circulated world-wide,
- best responses and solutions collected and promoted at the International Symposium on Sustainability Science (ISSS).

ISSS-Symposia will be annual, or biannual, international conferences, where business, government administrations, and NGOs meet with world-class sustainability scientists. To enhance its value for opinion leaders, decision makers and political as well as corporate leaders, ISSS will be a “one-stop-shop” uniting the scientific disciplines and R&D sectors relevant to the reigning Grand Challenge. Strong media promotion and attractive prizes for outstanding scientific work and a high public attention guarantee maximum visibility for sponsors of ISSS.

The ISSS launch event shall take place in 2009 and answer to the Grand Challenge (tentative) “Intelligent Energy and Resource Use for Future Cities”. The venue shall convey the atmosphere of a “future city” on its road to success and serious about sustainability. Of our three University-Cities, we propose Singapore as the one which is least history dominated and could most evidently become a model for rapidly evolving, sustainable urbanization.

OK & thm, Ch. F. Shih, Zurich & Basel & Singapore, 4 September 2007

SO7. Possible Capacity Building Role for IARU

Building the Research Capacity of Emerging Universities

Over the last decade, there has been an increased focus on issues related to international development, in particular:

- The growing disparity between rich and poor both globally and within individual countries and regions;
- Growing stress on the global environment and doubts about the sustainability of current economic practices;
- Local capability to manage issues of systemic change, including climate change; and
- The importance of basing development programs in knowledge and research.

IARU may be well placed to contribute to global efforts to address these issues, by building the research capacity of emerging universities in developing countries. The medium to long term objective of such a program would be to develop world class research facilities in less developed parts of the world, which, in partnership with IARU, would make a significant contribution to economic and social development in those countries and beyond.

The program would focus on assisting selected universities improve their general capacity to undertake high quality research, as well as develop world-class research skills in disciplines specific to the development agenda of the country concerned. Individual IARU members may assume a leadership role in respect to one or two institutions or aspects of the program, based on their particular research strengths and institutional links, although access to all components would be open to all IARU members.

An IARU initiative along such lines would require considerable funding, predominantly from external sources. The concept could be put to a consortium of educational foundations or philanthropic organisations for funding, although some involvement at the margin by the World Bank or other development institutions would enhance its credibility.

It is proposed that preliminary investigation be undertaken to develop a suitable pilot program to assess the viability of the concept, identify the practicalities of implementation, and explore the availability and likelihood of long term funding. ANU would be prepared to lead this process, but involvement from other IARU members would be most welcome in either an active or observer capacity.

The investigation and any subsequent pilot program would be undertaken in a low key, exploratory and cautious manner in order to avoid excessive expectations and to ensure that any future decision not to proceed further would not cause any embarrassment to IARU or its members.

If members believe this potential role warrants further investigation, a more detailed proposal could be developed for consideration by Presidents at their meeting scheduled for April 2008 at Yale University.

SO8. IARU and Careers

Global Students, Global Careers – Scoping proposal for the consideration of the September 2007 IARU Meeting

Introduction

University careers services have a long tradition in many of the world's great universities. The first careers service in the world, for example, was established at Oxford University over one hundred years ago.

Given their role in preparing graduates for employment, and in marketing graduates to an increasingly diverse and sophisticated range of employers, careers services occupy a unique position in providing both a valuable student service and a marketing link between the graduate employment community and the university.

Therefore, at a time when both student aspirations and graduate employment outcomes are becoming increasingly global, the IARU provides an excellent vehicle to foster relationships with employers globally and to assist students to make informed choices about the range of options open to them in the increasingly global world of work.

It also provides a unique opportunity for careers professionals in IARU universities to form a global professional network to share ideas and knowledge and to add value to the international student experience with the IARU.

Project Objectives

The Global Students, Global Careers Project has three main objectives.

1. To establish within the IARU universities, a Careers Professional Development Network, aimed at sharing ideas, expertise and knowledge of international employment trends. As some IARU universities have more developed Careers Centres than others, it is envisaged that they could take a leadership role in these professional development activities. All parties however would benefit strongly from the exchange of knowledge and ideas that this network would facilitate.

2. To promote IARU Careers Services jointly as a global preferred supplier of graduates to multinational and global recruiters. This would add value to our respective relationship building with employers, as it would encourage a 'one stop shop approach' to employers seeking to implement a global graduate recruitment strategy. Multilingual promotional material, as well as multilingual web-based advertising, could be used to promote this collaboration.

3. On a more day-to-day level, the third aim of the project is to facilitate the production of student resource material, to be produced locally and distributed through the IARU network, to assist students with practical information on living, working and studying in each IARU country. This would encourage and support student mobility and assist students to both experience life as a student in a different country and to place it in a careers context.

Achieving the Project Aims – the next step

The immediate proposal for further developing the Global Careers Project is to hold an inaugural IARU Global Students Global Careers Symposium in July or August 2008. NUS Careers Centre have held preliminary discussions with us here at ANU and have agreed in principle to host the event as a logical central point for IARU co-members.

Initial discussions with Berkeley**,** Yale and Cambridge have also indicated support for this symposium, the purpose of which would be to canvas the project idea and seek input on its further development from all IARU universities.

Given the importance that employers play in Careers Centres, and will ideally play in the project itself, representation will also be sought from peak graduate recruitment bodies for at least part of the symposium.

The co-ordination of the symposium will be jointly managed by ANU and NUS. Although delegate participation will be largely self -funded, the IARU secretariat may, ideally, be able to assist with some seed funding for the project to cover the venue and associated costs of the inaugural event.

Kate Gemmell

Director ANU Careers Centre

SO9. IARU Membership

Future Directions

This paper raises the question of whether a working group should be established to prepare recommendations to Presidents on future membership of IARU.

At the Inaugural meeting of IARU Presidents in Singapore in January 2006, presidents agreed on a three year moratorium on consideration of adding additional members. This was principally to allow the IARU time to establish itself and get some idea of the types of activities that would emerge.

While this moratorium will not expire until the end of 2008, it has been suggested that presidents may wish to consider this matter at their meeting at Yale in April 2008.

There are a range of factors that might need to be considered when deciding on possible new members:

a. The need for any new members to be similar in character to existing membership – ie staff and students can fit easily on each others' campuses, strong research record etc

b. The requirement to keep membership limited to ensure the alliance remains manageable

c. The desire to be a truly global alliance which might lead us to look at options in places like Africa, South America and India

d. Factors related to the geographic "balance" of the alliance

e. Existing relationships with current IARU members

The secretariat has received inquiries about IARU membership from several universities, some specifically seeking to join, others more general in nature. These include inter alia:

- Chinese University of Hong Kong
- Massachusetts Institute of Technology
- King Abdullah University of Science and Technology (KAUST) in Saudi Arabia:

A working group would need to balance the above factors which lead in very different directions. It would also consider timing.

For discussion and if agreed, nomination of membership.

SO12. Other Business

Making the Most of Ideas!
Outline proposal for an IARU Programme on Industrial Innovation

This note sets out a preliminary proposal to IARU for a programme to explore approaches to the transformation of ideas and opportunities into products and services - globally

Aims

- Map and interpret key international industrial developments
- Share leading practices in Industry/University/Government engagement
- Develop new approaches to the rapid industrial exploitation of ideas and opportunities

Background

It is now widely recognised that patterns of research, design, production and service are changing dramatically. Over 70% of new multi-national industrial investment in research is expected be in India and China next year and many production operations have already migrated.

The role of universities in industrial innovation and development has been increasingly highlighted in recent years. While few Universities see their primary role as to 'serve' industry many now recognise intellectual challenges as well as commercial opportunities in closer engagement with industry and commerce.

There are many approaches to such engagement and a wide range of successful examples of industry-academic partnerships. But traditional university structures can sometimes inhibit integrated multi-disciplinary engagements, making it difficult for the full potential of the wide range of academic expertise to be realised. It is worth noting that societal as well as industrial and commercial demand for larger scale and more integrated engagement of universities is growing

This proposal sets out a three year international programme to develop an improved understanding of industry trends, share good practices in engagement with industry and develop closer links between IARU partners in the field of industrial innovation.

Approach

The proposed approach envisages a series of three annual meetings each with a specific agenda and tangible output but with underlying 'bottom up' networking and partnership opportunities and the potential for specific international projects to spin-off in response to unanticipated developments at the annual meetings.

The underlying theme is the emerging structure of global industries and the opportunities for universities to engage with them.

Outline Programme

A three year programme is envisaged with each phase designed to deliver specific, stand-alone outcomes as well as providing foundations for future work.

Year 1 – Network Development

Activities

- Identification of potential participants in each institution
- Exploratory meeting possibly in UK – summer '08
- Development of conference themes and 'work packages'

Outcomes

- Network and communications
- Conference programme and organisation

Year 2 – Work Programme and Conference

Activities

- Mapping of industrial trends in partner countries
- Establishment of industrial partnerships
- Collection of University/Industry/Government engagement practices

Outcomes

- Conference to share findings and establish networks
- Facilitation of 'bottom up' projects
- Preparation for 'best-practice' guidelines on industrial engagement
- Establishment of standing 'industrial futures' group if agreed

Year 3 – Dissemination and review

Activities

- Publication of findings
- Workshops for 'bottom up' projects
- Analysis of effectiveness of the approach

Outcomes

- Continuing relationships as appropriate
- Report on an approach to IARU engagement

SO12. Other Business

IARU Financial Statement as at 11 September 2007

	USD	AUD
Income		
Members Contributions 2005	$100,000.00	
Members Contributions 2006	$200,000.00	
Members Contributions 2007	$200,000.00	
Total Income	**$500,000.00**	**$604,000.00***
**Including exchange gain/loss at 11/09/07*		
Expenditure		
Reimbursement to ETH Zurich for IARU Website		$23,520.49
Printing and Publishing Costs		$13,501.00
Stationery		$19,361.70
Trademark registration		$6,310.00
Bank Charges		$56.00
Secretariat costs		$181,000.00
2005 Secretariat salary contribution (USD 25, 000) *2005 Secretariat travel (accommodation & airfares) (USD 5,000)* *2006 Secretariat salary contribution (USD 50, 000)* *2006 Secretariat travel (accommodation & airfares) (USD 10, 000)* *2007 Secretariat salary contribution (USD 50, 000)* *2007 Secretariat travel (accommodation & airfares) (USD 10, 000)*		
Meetings		
Reimbursement to Yale for July 2005 Senior Officials meeting		$8,114.42
Reimbursement to NUS for January 2006 IARU Presidents' meeting		$30,691.00
Reimbursement to ETH Zurich for September 2006 Senior Officials meeting		$11,159.27
Reimbursement to ANU for March 2007 IARU Presidents' meeting		$37,379.77
Projects		
Reimbursement to Cambridge for 2006 IARU Understanding women project		$10,319.41
Reimbursement to UT for ERE research proposal		$4,360.17
Reimbursement to Cambridge for Security research proposal		$2,490.62
Total Expenditure	**$287,830.54***	**$348,263.85**
**Including exchange gain/loss at 11/09/07*		
Balance as at *11/09/07*	**$212,169.46***	

2007 projected expenditure	**USD**
Reimbursement to UT for September 2007 Senior Officials meeting	$10,000.00
Additional promotional stands (generic)	$1,075.00
Research leads reimbursement for Senior Officers Meeting (accommodation/travel)	$9,000.00