

Summary of academic programs that link science, environment and policy

“Embracing interdisciplinary research”

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It is globally recognized that there is a gap between the science of environmental studies and the execution of policy and practice (Sunderland T, et al. 2009; Moore et al. 2009; Pullin & Knight 2009). Therefore the future of environmental research, practice and funding largely depends on our ability to train leading experts and create interdisciplinary research centers (Pulliam et al. 2009 & Sunderland W, et al. 2009). These centers aim to connect fields of study such as natural sciences, ecology, conservation biology, policy and governance, environmental psychology, media and communication and economics. In recent years there have been several universities and institutes around the globe that have established programs and innovative centers that combine these fields. The skills obtained from such centers will equip a new generation of professionals to bridge the gap between science, policy and practitioners.

Interdisciplinary centers are utilizing terms such as “Conservation Management”, “Ecosystem Services” and “Sustainable Systems” to describe their programs. Conservation was introduced as a term to link theory in ecology and population biology with conservation policy and practice. The discipline conservation biology reaches far beyond biology and includes philosophy, economics, humanity, anthropology and education. Ecosystem services are the benefits that humans receive from biological diversity (Pulliam et al. 2009). This concept provides an important rationale for conserving biodiversity and developing policies. Another rationale is the notion of “Sustainability” which is viewed as the desired goal of societal development and environmental management (Brown et al. 2005). In this rapidly developing world there needs to be sustainable systems that allow economic and social progress without compromising the long-term impact on natural resources.

A conference held at Tel Aviv University (October 2010) addressed the contribution of academic research to the creation of environmental policy. It was recognised that university research and programs on a global scale aren't supporting the demands of decision makers and there needs to be an inter-disciplinary approach. University programs need to be tailored to the problems we face in today's society and produce professionals who are able to deal with issues that are multidisciplinary. The new **Environmental Policy Clinic** at the Tel Aviv University was commended for its works that promotes and informs environmental policy makers in Israel. Other examples of interdisciplinary programs from abroad suggest plausible ways to bridge this gap between university research and decision making.

The following examples of interdisciplinary institutes and centers are broken into two sections. The first sections concerns universities that have created centers that combined study fields which focus on conservation, ecosystem services and sustainability. This includes Harvard's Sustainability Science Program, Cambridge's Conservation Initiative and Conservation Science Group, Duke's ecosystem services centre and Cornell's Center for a

Sustainable Future. The second section describes examples of separate organizations that aim to connect conservation, ecosystem services and sustainability with the business management and policy arena. Examples include the Sustainability Institute in Vermont, and the World Resources Institute's Mainstreaming ecosystem service initiative.

University Examples

Tel Aviv University Tel Aviv, Israel

<http://environment.tau.ac.il/mainhe.asp>

The Porter School of Environmental Studies began in year 2000 and is the first and only multidisciplinary graduate school dedicated to environmental studies in Israel. The school has established a number of research institutes at the university in collaboration with other faculties. The new **Environmental Policy Clinic** was created with the department of public policy and works to promote and inform environmental policy makers in Israel through research and development of practical guidelines.

Harvard University Cambridge, Massachusetts

<http://www.hks.harvard.edu/>

The **Kennedy School of Government** is the hub of environment and natural resource policy study and action at Harvard. The school's objective addresses environmental challenges such as global-climate change, sustainability, energy technology innovation, economic effects of environmental policies, biological diversity and urban development. The school provides the opportunity for practitioners, policy makers and scientists to discuss and exchange ideas in a variety of domestic and international activities. The faculty coordinates its activities with the **Environment and Natural Resources Faculty Group**.

A **Sustainability Science Program** is also offered which supports policy-relevant research, training of students and fellows, outreach and teaching. The three key goals are to 1) Advance scientific understanding of human-environment systems 2) Improve linkages between research and policy communities and 3) Build capacity for linking knowledge with action to promote sustainability. The program does not provide degrees but is a competition to bring young professionals together to link science and practice for sustainable development.

Science, Technology, Innovation, and Public Policy Syllabus:

[http://ksgnotes1.harvard.edu/degreeprog/Syllabus.nsf/0/68331589ABA231B285257665007A04FA/\\$FILE/iga-205%20syllabus%20091105.pdf](http://ksgnotes1.harvard.edu/degreeprog/Syllabus.nsf/0/68331589ABA231B285257665007A04FA/$FILE/iga-205%20syllabus%20091105.pdf)

Technology and Sustainability Syllabus:

[http://ksgnotes1.harvard.edu/degreeprog/Syllabus.nsf/0/199DBBD60AB5C886852576A80050E403/\\$FILE/syllabus.pdf](http://ksgnotes1.harvard.edu/degreeprog/Syllabus.nsf/0/199DBBD60AB5C886852576A80050E403/$FILE/syllabus.pdf)

Freie University Berlin, Germany

<http://www.polsoz.fuberlin.de/en/polwiss/forschung/systeme/ffu/>

Professor Miranda Schreurs is the director of the environmental policy research centre (**FFU**) which was established in 1986. The centre consists of an international team of social science researchers and students who research, study and provide policy and political advice on environmental and sustainably energy issues. The centre engages in academia as well as policy-orientated studies. The FFU also offers one of the broadest social science educational programs on energy and environment for undergraduate and graduate students in Europe.

Some examples of work from the centre include analysing the role of cities in climate change mitigation and adaption, diffusion of environmental policy with best practise, ecological modernization and industrial transformation and policy analysis. The centre also runs workshops that explore biodiversity decision making simulations and scenario training that identifies which policies will lead to what outcomes.

Duke University Durham, North Carolina

<http://www.duke.edu/web/ESC/academics/curriculum/index.html>

The **Nicolas School for Environment** has established several research centers that aim to bring together skilled scholars and professions to focus on environmental and natural resource issues faced today. Such centres are run by Duke Faculty members, an array of public and private research organizations as well as neighboring universities. The centres do not offer courses but provide the opportunity for academics and professionals to engage in collaborative research. The **Ecosystem Service** working group/centre is an initiative that aims to map supply and demand for ecosystem services and build policies and markets that can be used in decisions and economy. The centre focuses on three main areas; biophysical, social and economic and legal and policy. Some of the other centres include; [Center on Global Change](#), [Center for Marine Conservation](#), [Climate Change Policy Partnership](#) and [Southern Center for Sustainable Forestry](#).

Cornell University Ithaca, New York

<http://www.sustainablefuture.cornell.edu/about/>

Cornell's **Center for a Sustainable Future** was established in 2007. The centre was established by the motive that tradition science and scholarly is necessary but not sufficient for the global challenges of today. The centre promotes new ways of thinking and solving problems via merging researchers, practitioners and external partnerships. Recently the center launched its **Faculty Fellows** program which incorporates 173 researches from various Cornell collages and faculties. The program promotes the work of researchers throughout Cornell University that focus

on sustainability. The centre also provides a list of 214 courses that address sustainability across faculties, departments, schools, and colleges within the university.

Curriculum: <http://www.sustainablefuture.cornell.edu/education/curricula/>

University of Michigan Dearborn, Michigan

<http://snre.umich.edu/coe/gesi>

The University of Michigan (U-M) established the **Graham Sustainability Institute** with the idea to produce future environmental sustainable experts and to solve sustainability problems. The institute is a collaborative partnership of the **School of Natural Resources and Environment** and nine U-M's schools and colleges. It also has a major role in promoting and co-ordinating academic programs such as interdisciplinary Doctoral Fellowship programs, a new Undergraduate Sustainability Scholars program, the student sustainability initiative and sustainability courses.

Sustainability Scholars Program: <http://www.graham.umich.edu/pdf/sustainabilitycourses.pdf>

University of Massachusetts Dartmouth Dartmouth, Massachusetts

<http://www.umassd.edu/sustainability/studies/welcome.cfm>

Sustainability at the University of Massacheutes Dartmouth is accessible to students via sustainability minors, certificate programs and MBA programs that incorporate inter-disciplinary fields of study. Some of the course offered include; Sustainable Living, Principles of Sustainability, Environmental Policy.

Certificate program: http://www.umassd.edu/online/sustainability/courses_fall.cfm

Minor program: http://www.umassd.edu/sustainability/studies/academics_courses.cfm

Australia's National University (ANU) Canberra, Australia

<http://fennerschool.anu.edu.au/fenner/info/>

ANU launched the **Fenner school of Environment** in 2007. The school focuses on "*interdisciplinary research and education on complex environment-society systems*". The aim is to prepare the future generation with education and training in integrated fields to build the skills needed to address the challenges of today's society. The school is affiliated with several other programs such as; ANU Climate Change Institute, National Institute for Rural and Regional Australia, ANU Water Initiative and Australian Sustainable Cities and Regions Research Network.

Courses: http://fennerschool.anu.edu.au/studying/undergrad/undergrad_courses.php

Arizona State University Tempe, Arizona

<http://schoolofsustainability.asu.edu/about/school/index.php>

Arizona State University's **School of Sustainability** was established in 2007 as part of the Global Institute of Sustainability. The school seeks solutions to world challenges by combining multiple disciplines of environment, economy and society. The school provides undergraduate and post graduate studies in sustainability and options to combine sustainability with business, engineering and law.

Courses: <http://schoolofsustainability.asu.edu/current-students/undergraduate/courses.php>

University of Cambridge England, UK

<http://www.conservation.cam.ac.uk/>

England's University of Cambridge has recently established The **Cambridge Conservation Initiative** which is collaboration between the University of Cambridge and leading conservation organizations. The centre strives to provide support for decision-makers on local, national and international levels of government and industry. In October 2010 the university is also offering a graduate program in Conservation Leadership together with major global and UK-based organizations.

Stanford University California, USA

<http://woods.stanford.edu/woods/about.html>

Stanford University has built The **Woods Institute for the Environment**. The institute suggests that finding practical solutions to environmental challenges requires leaders in research, business, and public policy that can effectively communicate and collaborate. The Woods Institute is providing researchers with leadership and communications skills and creating opportunities for decision-makers to learn about cutting-edge research through the prestigious Leopold Leadership Program. The program includes mid-career academic environmental scientists from North America to receive intensive experiential training, expert consultation, and peer networking. Leopold Leadership Fellows use skills to improve communication of science that is associated with complex environmental issues to the media, policy-makers, business leaders and other non-scientists.

The Woods Environmental Leadership Program facilitates Woods Institute staff to work with colleagues across campus and to provide researchers with resources on environmental leadership. Staff with expertise in science communication coach individual researchers and research groups for the translation of their work to audiences outside of academia. Furthermore they develop outreach plans for sharing their work with business, policy, and public audiences. Through its strategic

collaborations and communication, the institute brings faculties together with leaders from the private and public sectors to develop pragmatic approaches and tools for solving major environmental challenges. Finding practical solutions also requires leaders in research, business, and public policy who can effectively communicate and collaborate.

Information for teachers/students: <http://woods.stanford.edu/education/teachers-students.html>

The University of Queensland Brisbane, Australia

<http://www.aeda.edu.au/>.

The University of Queensland in Australia is leading The **Applied Environmental Decision Analysis** (AEDA) research hub, funded through the Commonwealth Environment Research Facilities (CERF) programme, an Australian Government initiative supporting world class, public good research. AEDA was established to develop tools and test methods to support transparent decision-making for environmental management. Where possible, it also provides guidance for organizations wishing to use these new tools. AEDA focuses on three areas of innovation, including (1) Monitoring - examining why, what and how monitoring is carried out in order to ensure it is done effectively. This theme also examines how much money is spent on what; (2) Prioritization and spatial planning - research on how resources are best applied in issues such as designing reserves or allocating funds for the management of threatened species; (3) Environmental decision making - Investigating how we makes decisions. This theme overarches everything AEDA does. How do groups of people come to make decisions?

The research being done by AEDA underpins major natural resource management efforts such as state-of-the-environment reporting, ameliorating the impact of habitat fragmentation, water management, invasive and threatened species management and adapting to global warming.

Course List - Master of Environmental Management, Sustainable development:

http://www.uq.edu.au/study/program_list.html?acad_prog=5174

Columbia University New York, USA

<http://www.cerc.columbia.edu/>

The **Center for Environmental Research and Conservation** (CERC) builds environmental leadership and emphasizes the essential role of the natural world in sustainable development. Through the synthesis of research, applied research and education and training, CERC aims to stem the loss of biological diversity and cultivate leadership to address the ecological challenges of the 21st century.

CERC is a consortium of five world renowned scientific institutions based in New York City: Columbia University, the American Museum of Natural History, the New York Botanical Garden, the Wildlife Conservation Society and Wildlife

Trust. Each member of the consortium contributes to developing environmental leadership through a variety of education and research programs. Collectively, this work is conducted in over 60 countries.

CERC is headquartered at the Earth Institute, Columbia University. This strategic location facilitates multidisciplinary work within the university and with external collaborators. CERC is also responsive to the non-science community, providing training and education through the application of understandable, robust conservation science.

Certificate program in Conservation and Environmental Sustainability:

http://cerc.columbia.edu/sitefiles/file/CERT_Course_Descriptions_2010_1_Updated_6_30_2010.pdf

University of British Columbia Vancouver, Canada

<http://cacr.forestry.ubc.ca/>

The University of British Columbia's **Centre for Applied Conservation Research** (CACR) was established in 2001. The centre changed name from the Centre of Applied Conservation Biology to reflect its incorporation of social and economic fields. It boasts a membership of 70 faculty research scientists and graduate students with the common goal of developing solutions to interdisciplinary problems that we are faced with today.

Courses: <http://www.cerc.columbia.edu/?id=certificate-courses>

Yale University New Haven, USA

<http://cbey.research.yale.edu/>

The **Centre for Business and Environment** at Yale University provides research and education for today's society where environmental awareness is an important aspect of the business world. The centre connects two world class graduate schools – The Yale School of management and the Yale school of forestry and environmental studies. The centre joins students, executive, academics and policy makers to advance business solutions in the context of global environmental challenges.

Courses: <http://cbey.research.yale.edu/index.php?page=course-table>

<http://cbey.research.yale.edu/index.php?page=othercourses>

Stockholm University Stockholm, Sweden

<http://www.stockholmresilience.org/aboutus.4.aeea46911a3127427980003326.html>

The **Stockholm Resilience centre** is an international centre that uses trans-disciplinary research with the goal to provide new management and governance practices. The centre was established in 2007 as a joint initiative with Stockholm University, the Stockholm Environment Institute and the Beijer International Institute of Ecological Economics at The Royal Swedish Academy of Sciences. Also the Centre for Trans-disciplinary Environmental Research (CTM) at Stockholm University and The Baltic Nest Institute (former MARE) are part of the centre.

University of Prifysgol Bangor, Wales, UK

<http://www.cebc.bangor.ac.uk/index.php.en?menu=0&catid=0>

The **Centre for Evidence Based Conservation (CEBC)** was created due to poor access of scientific evidence for decision makers. The aim is conduct systematic reviews of scientific evidence that can be utilised by policy makers and managers in the environment sector. The centre strives to conduct training programs which use results from systematic reviews to continually improve supporting tools for managers. PhD projects are also offered by the centre.

Portland State University Oregon, USA

<http://www.pdx.edu/sustainability/center-sustainable-processes-and-practices>

The **Center for Sustainable Processes and Practices (CSP2)** was established in 2006. The centre merges an array of academic disciplines for the creation of sustainable practices and approaches. This is further enhanced with the partnership of businesses, government and organizations. The center offers Post doctoral programs as well as the Graduate certificate in sustainability. In September 2010 the new director of the centre will be Robert Costanza who is renowned for his skills in linking sustainability and ecological economics.

Course: <http://www.pdx.edu/unst/cluster-environmental-sustainability>

University of Canberra Australia

The University of Canberra has a new elective major and minor in Sustainability. These new courses provide students with an opportunity to develop trans-disciplinary thinking skills within a problem solving context. Therefore they obtain an appreciation of how environmental sustainability can be better governed by human societies around the world.

Sustainability Major:

<http://www.canberra.edu.au/courses/index.cfm?action=detail&electiveid=MJ0155&year=2010>

Monash University Australia

Graduate Program in Environment and Sustainability:

<http://arts.monash.edu.au/ges/pgrad/mes/pdf/m-env-sust-hndbk-2010.pdf>

California State University Stanislaus

Ecology and Sustainability Master of Science Program:

<http://arnica.csustan.edu/Ecology/>

<http://science.csustan.edu/pam/Biol5030/Syllabus.html>

2. Separate Organizations Examples

ATREE Bangalore, India

Access: <http://www.atree.org/purpose>

The objective of ATREE is to promote environmental development and conservation that actively engage with academics, policy makers, practitioners, activists, students and the public. The academy is geared towards PhD programs as well as certificate courses, training and workshops. The structure of the organization consists of two centers; The Suri Sehgal Centre for Biodiversity and Conservation and Centre for Environment and Development and four programs; Ecosystems and global change, Ecosystem services and wellbeing, Forests and governance, Land water and livelihoods. There is a stronger emphasis on field work as well as engagement with the public community.

Sustainability Institute Hartland, Vermont

Access: <http://www.sustainer.org/>

The institute was found in 1996 with the aim to implement tools and systems to aid better decision making about environment, economics and societal concerns. Through consultation, workshops and programs the institute develops frameworks to target large-scale sustainability issues. The **Donella Ledership Fellows Program** trains people in the context of their current job to implement a global shift to sustainable methods.

The South African National Biodiversity Institute (SANBI) Pretoria, South Africa

Access: <http://www.sanbi.org/>

The institute is responsible for ensuring that biodiversity knowledge and research is influencing managers and policy makers. The biodiversity education and empowerment division of SANBI works with schools, educators, universities, communities, NGO's and government. It is also responsible for the nine National Botanic Gardens in South Africa.

World Resources Institute Washington DC

Access: <http://www.wri.org/project/mainstreaming-ecosystem-services>

The aim of the World Resources Institute is to move society in a direction that protects Earths' environment but meets the needs of future generations. The **Mainstreaming ecosystem services initiative** (MESI) strategy is to provide decision makers with tools and knowledge that includes the health of the ecosystem in economic and social matters. MESI targets managers of the business realm as well as public sector decision makers such as mayors, national legislators, planning commission members and Multilateral Development Banks (MDBs). They also focus on ecosystem services for development. The objective is to provide developing countries with information about the connection of human wellbeing to the surrounding ecosystem. The project expands by establishing partnerships with many countries in South Africa. Countries where they have already made progress include Kenya and Uganda. Currently MESI is working on the application of ecosystem service approaches for procedures that occur on-the-ground.

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