

**Sub-Antarctic Research Alliance
University of North Texas and Universidad de Magallanes**

Tracing Darwin's Path:

Exploring "Hidden" Biodiversity and Approaches to Biocultural Conservation Developed in the Cape Horn
Biosphere Reserve

Dates: December 26, 2009 – January 13, 2010

Course Instructors:

- Dr. James Kennedy, Department of Biological Sciences, University of North Texas
- Dr. Ricardo Rozzi, Department of Philosophy and Religion Studies, University of North Texas and Universidad de Magallanes
- Dr. Christopher Anderson, Sub-Antarctic Research Alliance, University of North Texas and Universidad de Magallanes, Chile
- Dr. Dale Wilkerson, Department of Philosophy and Religion Studies, University of North Texas
- Paola Vezzani, Visual Artist, "Tourism with a Hand Lens Project" – Omora Program and Visiting Professor, Universidad de Magallanes
- Dr. Andrés Mansilla, Director of Research, Universidad de Magallanes
- Dra. Francisca Massardo, Coordinator Puerto Williams Center, Universidad de Magallanes

Course Number:

University of North Texas

PHIL 4960/5960 or BIOL 4005/5005

Exploring the "Hidden" Biodiversity and Approaches to Biocultural Conservation Developed in the Cape Horn Biosphere Reserve

Universidad de Magallanes

Master's of Science Elective Course in Interdisciplinary Biocultural Conservation

General Course Description:

Since 2006, students from the United States and various Latin American countries (principally Chile) have taken part in the interdisciplinary field course Tracing Darwin's Path. In each iteration, the program develops a particular emphasis. In previous versions, TDP has developed extensively areas related to watershed conservation, ethno-ecology, nature writing and long-term socio-ecological research. In December 2009/January 2010, the activities will focus largely on **Art, Philosophy and Science as Complementary Ways of Observing and Understanding the World.** The course will provide undergraduate and graduate students with a hands-on interdisciplinary and international research, conservation and education experience at one of the most pristine wilderness areas remaining in the world, the subantarctic Cape Horn Biosphere Reserve (located in Chile at the southern tip of South America). Broadly speaking, all TDP courses include aspects of i) watershed biodiversity and conservation, ii) invasive exotic species and iii) human perceptions and relationships with nature. These multiple approaches will permit students to *link society and development with biodiversity and ecosystems*. TDP is taught in partnership between UNT and the University of Magallanes (UMAG), Chile

as part of the joint Sub-Antarctic Research Alliance. This study abroad is also part of the field course series that takes place annually at the Chilean Long-Term Socio-Ecological Research (LTSER) Network's field sites (http://www.ieb-chile.cl/ltser/curso_campo.php). The class will spend time both in Punta Arenas, the regional capital, and Puerto Williams, the world's southernmost town and capital of the Chilean Antarctic Province.

Specific programs and topics:

- *Hidden Diversity*
 - *Watershed ecology* – the role of the invertebrates in ecosystem process and the link between terrestrial and aquatic ecosystems
 - *Miniature forest* – the unperceived diversity of mosses, lichens and liverworts found in Cape Horn and their importance for ecosystem services
- *Global change*
 - A holistic approach to social-biological change that looks at the homogenization of species and human perceptions of them
 - invasive exotic species and “mindsets” regarding what kind of biological and cultural diversity we value
- *Long-term Socio-Ecological Research Sites*
 - Integrating science and society to address global change
 - UNESCO Man and the Biosphere Program
- *Changing Lenses*
 - A comparative conceptual critique of frameworks and methodologies used by different disciplinary and social groups
 - aesthetic, philosophical and scientific

Specific goals for students' learning experience

1. Develop skills of observation thru art and science to describe and investigate some of the less conspicuous components of biodiversity. This focus involves biological, aesthetic and philosophical questions.
2. Acquire an ethical dimension to the process of inquiry, including the development of “face-to-face” encounters with human and non-human beings.
3. Observe, analyze and distinguish biocultural homogenization processes.

Program Components

The course will take place in two settings:

- a) Punta Arenas is the regional capital of the Magallanes and Chilean Antarctic Province and will be used from 26 December to 2 January as the base of operations for an intensive introduction to “philosophical and artistic” aspects of the class.
- b) Omora Ethnobotanical Park, one of three LTSER sites in Chile, will be visited from 2 to 10 January to study and experience ecological, philosophical and conservation issues of subantarctic ecosystems and to demonstrate the integration of society and science at the Cape Horn Biosphere Reserve.

Credit and eligibility

UNT students who meet GPA requirement of 2.0 or greater are eligible to receive 3 UNT biology or philosophy credit hours

Recommended Pre-Requisites: UNT: Biol 4005/5005 or Phil 4960/5960

Grading

1) Essays (10%)

Each student will elect one of the class topics (see above) and using the required literature develop a 5-10 page (12 font, double spaced) essay summarizing that theme of the course. Essays will be collected on the first day of class.

2) Natural History / Art Journal (30%)

When reading Charles Darwin's journal *Voyage of the Beagle* about his 5 year trip around the world, it is striking the way he blends scientific observation with reflections about the broader implications, context and surroundings (including cultures) he was encountering. Other examples include Lewis and Clark's writings about the American West. We would like to "trace Darwin's path" and ask each student to keep a journal of the day's reading, reflections, activities and achievements. Entries should consist of reflections on the assigned readings and/or activities and observations made during field activities. Ideally field notes will be made using a waterproof pen (or pencil) in a journal with waterproof paper (such as Rite in the Rain, All-Weather Journal). Rite in the Rain note book will be provided to you however, other notebooks can be used but they must be bound and should be protected in a sealable plastic bag. Maximum size for the field notebook should be approximately 8.5" x 11" when two pages are open. This will enable the journal to be xeroxed conveniently. This size will also be convenient to carry in the field, which will be necessary, since recordings in journals are meant to be done on the day of the activities. In addition, you will need purchase and keep an art notebook separate from the journal, with the same dimensions, but ensuring a hard cover and 180 to 240 weight paper that allows for water colors and will need to be protected in a sealable plastic bag. Other art materials will be provided in Chile. Student journals will be checked randomly throughout the course. Suggestions will be made on improving the quality of the journal format. It will be expected that journal entries are, as reasonably as possible, kept up to date. On occasion students will be selected to read sections of their journals to the class for discussion. *At the end of the class journals will be collected, and may be copied before being returned to the student.*

3) Presentations (30%)

The course participants will be divided into three work groups for the purpose of developing a final presentation. The presentation will be given near the conclusion of the course and should be approximately 20 minutes in length. As much as possible, the work groups will be structured to represent a cross section of academic interests of the course participants (i.e., groups will be as interdisciplinary as possible). The goal of each group will be to develop a presentation that highlights and synthesizes each student's perceptions and interpretations of courses activities.

4) Participation (30%)

Student responsibilities are to prepare ahead of time, attend all the discussion sessions, field exercises, ask questions, and express yourself creatively and concisely in your work. Ways of earning points for class participation include being prepared to contribute positively to class discussion of the assigned readings and participate in field exercises. Contributing positively requires having read, and as

thoroughly as possible understood, the assigned readings and at least being able to raise important questions if not providing definitive answers.

Readings

PDF on course website

- Anderson, C.B., R. Rozzi, J.C. Torres-Mura, S.M. McGehee, M.F. Sherriffs, E. Schuettler & A.D. Rosemond (2006). Exotic vertebrate fauna in the remote and pristine sub-Antarctic Cape Horn Archipelago region of Chile. *Biodiversity and Conservation* 10: 3295-3313.
- Anderson, C.B. & A.D. Rosemond (2007). Ecosystem engineering by invasive exotic beavers reduces in-stream diversity and enhances ecosystem function in Cape Horn Chile. *Oecologia* 154: 141-153.
- Anderson, C.B., R. Rozzi, G.E. Likens, J.R. Gutiérrez, A. Poole & J.J. Armesto (2008). Using long-term socio-ecological study sites to integrate research with society. *Environmental Ethics*. 30: 295-312.
- Borrero, L. A. 1997. *The Origins of Ethnographic Subsistence Patterns*. In *Patagonia: natural history, prehistory, and ethnography at the uttermost end of the earth*. Princeton University Press: Princeton, NJ. 60-81.
- Caliman, Adriano, Aliny F. Pires, Francisco A. Esteves, Reinaldo L. Bozelli, Vinicius F. Farjalla. 2009. The prominence of and biases in biodiversity and ecosystem functioning research. *Biodiversity and Conservation*. Online. DOI 10.1007/s10531-009-9725-0
- Callicott, J. Baird (2008). What "What Wilderness" in Frontier Ecosystems? *Environmental Ethics*. 30: 233-306.
- Darwin, C. Chapter X: Tiera Del Fuego. In *Voyage of the Beagle*. <http://www.literature.org/authors/darwin-charles/the-voyage-of-the-beagle/chapter-10.html>
- Kuhn, T.S. The Structure of Scientific Revolutions: A Synopsis from the original by Professor Frank Pajares. *Philosopher's Web Magazine*. Website: <http://www.des.emory.edu/mfp/kuhnsyn.html>. Accessed 1 December 2009.
- Larson, B. 2005. The war of the roses: demilitarizing invasion biology. *Frontiers in Ecology and the Environment* 3(9): 495-500
- Leopold, A. 1949. Thinking Like a Mountain. Website: <http://www.eco-action.org/dt/thinking.html>. Accessed 1 December 2009.
- Martinic. Indians and colonists. 1997. *The Origins of Ethnographic Subsistence Patterns*. In *Patagonia: natural history, prehistory, and ethnography at the uttermost end of the earth*. Princeton University Press: Princeton, NJ. 110-126. http://www.osara.org/darwin_2008/required/Martinic%20Patagonia.pdf
- Moorman, M.C., C.B. Anderson, A.G. Gutiérrez, R. Charlin & R. Rozzi (2006). Watershed conservation and aquatic benthic macroinvertebrate diversity in the Alberto D'Agostini National Park, Tierra del Fuego, Chile. *Anales del Instituto de la Patagonia* 34: 41-58.
- Rodriguez, J.P. et al. 2007. Globalization of Conservation: A View from the South. *Science* 317: 755-756.
- Rozzi, R., J. Silander Jr, J.J. Armesto, P. Feinsinger, F. Massardo 200. Three levels of integrating ecology with the conservation of South American temperate forests: the initiative of the Institute of Ecological Research Chiloé, Chile. *Biodiversity and Conservation* 9: 1199–1217.
- Rozzi, R., F. Massardo, C.B. Anderson, K. Heidinger & J.A. Silander Jr. (2006). Ten principles for biocultural conservation at the southern tip of the Americas: the approach of the Omora Ethnobotanical Park. *Ecology and Society* 11: 43. <http://www.ecologyandsociety.org/vol11/iss1/art43/>
- Rozzi, R., X. Arango, F. Massardo, C. Anderson, K. Heidinger & K. Moses. 2008a. Field Environmental Philosophy and Biocultural Conservation: The Omora Ethnobotanical Park Educational Program. *Environmental Ethics* 30 (3): 325-336.
- Rozzi, R., J. Armesto, B. Goffinet, W. Buck, F. Massardo, J. Silander, M. Kalin-Arroyo, S. Russell, C.B. Anderson, L. Cavieres & J.B. Callicott. 2008b. Changing biodiversity conservation lenses: insights from the sub-Antarctic non-vascular flora of southern South America. *Frontiers in Ecology and the Environment* 6: 131-137.
- Simberloff, D. (1980). A succession of paradigms in ecology: essentialism to materialism and probabilism. *Synthese* 43: 3-39.

Required purchases

- Haeckel E., O. Breidbach, R. Hartmann, I. Eibl-Eibesfeldt. *Art Forms in Nature: The Prints of Ernst Haeckel (Monographs)* (Paperback)
- Nietzsche, Friedrich, Walter Kaufmann (translator) *The Gay Science: With a Prelude in German Rhymes and an Appendix of Songs.*

General Itinerary

Sunday, 27 December: Arrive to Chile. Stay in Santiago at Hostal Forestal. Visit Natural History Museum and Santiago historic sites.

Monday, 28 December: Fly to Punta Arenas. Visit Reserva Magallanes and participate in “observation thru art” and analysis of trail system. Evening film on Ernst Haeckel (Readings 28-30 December: Rozzi et al. 2008a,b, Haeckel book)

Tuesday, 29 December: Visit Otway Penguin Colony and participate in description of the habitat, habits and inhabitants.

Wednesday, 30 December: Visit to Regional Museum and characterize plants in garden of Braun Museum and essay on historical process of colonization and homogenization (Readings: Borrero 1997 and Caliman et al. 2009)

Thursday, 31 December: Raise and discuss philosophical questions of interpretation (Readings: *Gay Science*).

Friday, 1 January: Celebrate New Years and Chile’s Bicentennial

Saturday, 2 January: Fly to Puerto Williams. Introduction to Puerto Williams. Discuss paradigms in science (Readings: Kuhn and Simberloff)

Sunday, 3 thru Wednesday, 6 January: Camp at foot of Dientes Mountain Range. Initiate “direct encounter” with biodiversity and sampling. Three topics: i) exotic species, ii) invertebrates and iii) bryophytes. (Readings 3-10: Anderson et al. 2006, Anderson & Rosemond 2007, Anderson et al. 2008, Darwin 1859, Larson 2005, Martinic 2005, Moorman 2006, Callicott 2008, and Leopold 1949)

Thursday, 7 January: Work in the Omora Park (Rozzi et al. 2006, Rodriguez et al. 2007).

Friday, 8 January: Work in the Omora Park.

Saturday, 9 January: Embark for Punta Arenas aboard ferry. Describe the landscape change and compare with observations made by Darwin (Darwin 1859).

Sunday, 10 January: Arrive to Punta Arenas in late evening.

Monday, 11 January:

Tuesday, 12 January: Fly Santiago and USA.