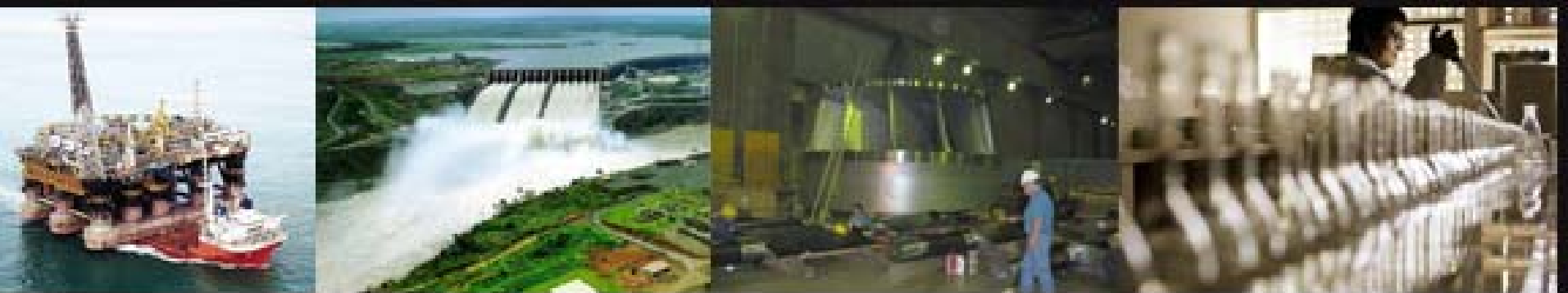




# *Collaborative Field Course in Brazil:* **Energy, Water, and the Environment**

**January 7<sup>th</sup> – 21<sup>st</sup>, 2010**





# Course Objectives

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- Provide an opportunity for students to explore and progress in areas that could be the focus of subsequent academic work (such as a senior thesis or graduate degree)
- Establish and reinforce relationships between participants that help generate international research, teaching, and field work opportunities
- Help build a network of research and teaching collaborations between Harvard University and partner institutions in Brazil

# Organizing Institutions

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- School of Engineering and Applied Sciences (SEAS), Harvard University



- Escola Politécnica (Poli), Universidade de São Paulo (USP)



- David Rockefeller Center for Latin American Studies (DRCLAS), Harvard University



# Course Overview



- **Format & Content Areas**
  - 10 Harvard students, 10 Brazilian students
  - Harvard and Brazilian faculty and researchers
  - Integrated, international learning & teaching
  - Two course modules
    - Urban Environment & Water
    - Energy & Environment
- **Language**
  - Lectures will be in English. Portuguese language skills, while desirable, are not required.
  - Harvard students will be paired with English speaking participants from Brazil.



# Geographic Scope



- **São Paulo, SP:** field visits to the city's largest drinking water treatment facility, informal slum community, and highly developed parts of metropolis. Lectures and discussions hosted at the Universidade de São Paulo's School of Engineering (Poli).
- **Foz do Iguaçu, Paraná:** technical site visit to one of world's largest hydroelectric dams (Itaipú) and visit to Iguaçu falls.
- **Rio de Janeiro, RJ:** visit to the research and development facilities of Petrobras, global oil & gas leader.
- **Campinas & interior of São Paulo:** Visits to leading sugar based-ethanol research facilities.



# Course Faculty



## *Partial listing of confirmed faculty*

### HARVARD FACULTY



**Scot T. [Martin](#)** - Gordon McKay Professor of Environmental Chemistry, School of Engineering and Applied Sciences (SEAS)  
*Harvard faculty leader for course.*



**Marie [Dahleh](#)** – Assistant Dean for Academic Programs and Senior Lecturer on Engineering Sciences, School of Engineering and Applied Sciences (SEAS).



**John [Briscoe](#)** - Gordon McKay Professor of the Practice of Environmental Engineering, School of Engineering and Applied Sciences (SEAS); former Country Director of World Bank in Brazil.

### USP FACULTY



**Monica [Porto](#)** – Professor of hydrological resources, school of engineering, Universidade de São Paulo (Poli-USP)  
*USP faculty leader for course.*



**José Carlos [Mierzwa](#)** - Professor of Environmental Engineering and Water Treatment, Universidade de São Paulo (Poli-USP).



**José [Goldemberg](#)** – Former President of Universidade de São Paulo; Secretary of Science and Technology; Secretary of the Environment; Minister of Education; and President of São Paulo state electricity provider (CESP).



# Academic Expectations



- Participants will have the opportunity to visit world-class facilities in Brazil as part of this research and teaching-driven program. This is not a vacation. Students will be chosen through competitive processes headed by the SEAS at Harvard and the USP engineering school in Brazil.
- Five groups, each of which will be composed of Harvard and Brazilian students, will be responsible for synthesizing key discussion points and questions.
- Relevant readings will be made available to students in advance of the field course.
- Active engagement and intelligent questions are expected – as participants will have the unique opportunity to engage with world-renowned scientists and engineers (including former Ministers and heads of regulatory agencies in Brazil).
- Students will present project ideas at the conclusion of the collaborative course.



# Site Visit: Hydroelectric Dam (Itaipu)



## Overview:

Itaipu Binacional is a company that runs the largest operational hydroelectric power plant in the world. It is an undertaking run by Brazil and Paraguay at the Paraná River on the border section between the two countries, 15 km north of the Friendship Bridge. The installed generation capacity of the plant is 14 GW, with 20 generating units of 700 MW each. In the year 2000, it achieved its generating record of 93.4 billion kilowatt-hours (kWh), which supplied 93% of the energy consumed by Paraguay and 20% of that consumed by Brazil.

## Of Note:

- Largest hydroelectric power plant in the world;
- Hydro accounts for 80% of Brazil's electricity;
- Provides a unique view of an important source of renewable energy;
- Located in close proximity to stunning Foz do Iguaçu waterfalls



## The Global Challenge which this Illustrates:

Maximizing the potential and minimizing the risks of hydroelectric power.



# Site Visit: Drinking Water Treatment Facility



## **Overview:**

The Guaraú water treatment plant (ETA Guaraú) is responsible for the water treatment of the Cantareira System, one of world's largest. It has received several national and international awards, including the "best of the Americas" in 1996.

## **Of Note:**

Facility treats approximately 50% of the drinking water for metropolitan São Paulo; ETA Guaraú has the capacity to treat 33 cubic meters of water per second.

## **The Global Challenge which this Illustrates:**

Providing safe drinking water to one of the world's largest mega-cities.





# Travel Logistics

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- **Passport and visa:**
  - Depending on your nationality, you may need a visa to travel to Brazil. Visas are required for U.S. citizens. Instructions for obtaining a visa will be provided.
- **International Flights to Brazil:**
  - A number of major U.S. airlines fly to Brazil (American Airlines, Continental, Delta, United)
  - Students should buy tickets shortly after acceptance to the program as January is the peak of the summer season in Brazil.
- **Additional information:**
  - Additional details regarding immunizations, recommended clothing, sun/insect protection, cell phone/internet access, etc. will be provided prior to departure.



# Long-term Objectives



*This Energy, Water, and Environment course is based on a model established by a similarly structured public health collaborative field course that was launched three years ago. We hope that students and faculty involved in this course go on to related learning and research experiences, as has been the case in the collaborative courses in public health:*

- 2 Harvard students who participated in the course in 2009 are pursuing Masters theses on topics resulting from their participation in the course;
- 1 Brazilian participant in the inaugural 2008 edition of the course was accepted to a Masters in Public Health degree program at Harvard (entering in fall 2009);
- 1 Harvard PhD student who participated in the 2008 edition of the course received a Fulbright grant directly related to the doctoral research that resulted from her participation in the course;
- Harvard and Brazilian course faculty from the 2009 course co-authored a paper and have submitted it to a leading publication for review.
- In an anonymous survey, 100% of students from Harvard and Brazil responded that they anticipate the 2009 public health field course will have an impact on their academic, personal, and/or professional plans in the future;
- 97% of students said that the participation of foreign students (Brazilians if from Harvard or non-Brazilians if from Brazil) was positive;
- 97% of participants stated that they would recommend the course to others.



# Website & Contact Info



[www.drclas.harvard.edu/brazil/seas2010](http://www.drclas.harvard.edu/brazil/seas2010)

The screenshot shows the website for the Brazil Studies Program at Harvard University. The header includes the program name and a search bar. A navigation menu lists various categories like Home, Students, Faculty, etc. The main content area features a prominent announcement for a field course titled "Science & Engineering in Brazil: A Winter Session Field Course on Energy, Water, and the Environment (January 2010)". Below the title is a collage of four images: an offshore oil rig, a dam, an industrial facility at night, and a laboratory setting. The text describes the course as a joint initiative between Harvard's School of Engineering and Applied Sciences (SEAS), the Escola Politécnica of the Universidade de São Paulo (USP), and the DRCLAS Brazil Studies Program. It mentions that Scot Martin, Gordon McKay Professor of Environmental Chemistry, is leading the course. The course will include Brazilian students and faculty from throughout the country and will take place in Brazil from January 7th to January 21st, 2010. At the bottom of the announcement, there are three links: ">> Course Overview", ">> Field Sites", and ">> Faculty Leadership & Course Organizers".

- Jason Dyett (Program Director, DRCLAS Brazil Office)

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