Meetings/Events & Dept. News

Undergrad/Graduate Student News

University News

DEPARTMENT NEWS

EAPS COLLOQUIA

Shaoqing Liu
PhD Candidate
Tuesday, November 1, 2016
4:00 PM
HAMP 2201

Srikanta Mishra Battelle
Faculty Candidate
Wednesday, November 2, 2016
9:30 AM
HAMP 2201

Kristin Morell
University of Victoria
Thursday, November 3, 2016
3:30 PM
HAMP 1252

EAPS HOLIDAY SCHEDULE

Thanksgiving: Nov. 24 & 25, 2016
Christmas: Dec. 23-26, 2016
Winter recess: Dec. 27, 28, 29, 2016
President’s Designated Holiday: Dec. 30, 2016
New Year’s Holiday: Jan. 2, 2017

http://www.eaps.purdue.edu/
**EARTH SCIENCE PASSPORT DAY**

**IMAGINATION STATION**

**Who:** Kids ages 5-9  
**When:** Saturday, Nov. 5, 2016  
**Where:** Imagination Station  
600 N. 4th St., Lafayette IN  

**Earth Science Passport Day Educators:**  
- EAPS Graduate Students and Faculty  
- Members of PUGS, PUMA, & PUPS

Please see attached flyer for more details.

---

**EAPS OMBUDSMAN**

What is an Ombudsman? The ombudsmen are an informal, neutral, confidential resource for people in the department, especially students, to raise questions or concerns about any aspect of their academic experience. The EAPS ombudsman is Barbara Gibson (HAMP 2169B; barbara@purdue.edu) - please feel free to contact her if needed.

**TERRY WEST ATTENDS CHICAGO SECTION MEETING OF THE ASSOCIATION OF ENVIRONMENTAL AND ENGINEERING GEOLOGISTS (AEG)**

Terry West and a group of students attended the Chicago Section meeting of the Association of Environmental and Engineering Geologists (AEG) on October 18, 2016 for the dinner meeting and presentation of the program by Dr. Chris Stohr, an alumnus of EAPS. The title of his presentation was “Origins of Early Landfill Studies in Illinois and Development of Low-Cost Monitoring of Closed Landfills by Remote Sensing”. Chris completed his master’s degree in remote sensing working through LARS, the Laboratory of application of Remote Sensing, in 1974, with Terry West as his research advisor. There are over 3400 closed landfills in Illinois that require long-term monitoring.

---

**EAPS FACULTY AND STAFF RESOURCE FUND**

The EAPS Faculty and Staff Resource Fund provides faculty and full-time, permanent staff with a simple, open, and transparent way to request resources they need to be productive in their work. This is not intended to replace other sources (e.g. grants, discretionary accounts, start-up, competitive programs on campus, and usual supplies and expenses), rather it is to meet occasional needs that are important for individual productivity and advancement in cases where these other sources are not available to an individual. Examples include professional development course tuition, office needs, and professional conferences.

**Procedure:**  
Applications to the fund should be sent via email (as a pdf) to the Assistant Department Head. Requests must include the following items and not exceed one page applicants name, position title, email address a detailed, one paragraph description of what is being requested a short explanation of how this will help the individual be productive in their work amount requested (this program will accept requests between $200 and $2,000) time constraints on what is being requested (e.g., a deadline for registration)

**Request deadline is the 20th of each month.**  
Decisions will be made by the 5th of the following month. All requests will be reviewed by a group including the Assistant Department Head, the Business Manager, and at least two members of the EAPS Executive Committee.

---

**STUDENT NEWS**

**PUGS/PGSA SPEAKER**

**RAMIN ANSARI-LIVING WATER: A VOLUNTEER EFFORT TO DEVELOP WATER WELLS IN HONDURAS**

Wednesday, Nov. 2, 2016  
6:00 PM  
HAMP 2201  
(REFRESHMENTS INCLUDED)

Ramin Ansari has BS (Geology, Wittenberg College) and MS (Engineering Geology, Texas

[Link to website]

http://www.eaps.purdue.edu/
A&M) degrees in geology, and currently serves as Director, Environmental Affairs & Remediation, and as Corporate Responsible Care Coordinator at Chemtura in Lafayette. Recently he has volunteered with Living Water International (a faith-based organization helping communities in need get access to clean water) in developing water wells in Honduras. Mr. Ansari will talk about the water well project and more generally about how he has used geology in his career, and there will be an opportunity for questions and discussion.

---

**WINTER BREAK 2016-2017 COURSE ANNOUNCEMENT**

Approved Course: Caribbean Ecosystem Field Studies

They are accepting applications for their winter-break field course: Caribbean Ecosystem Field Studies

This course (ENST 391) is approved for 3 undergraduate semester credits through the Environmental Studies Program of the University of Montana at Missoula and is open to students in an ecosystem related department or major.

Please click here with any questions.

---

**VII EARTH SCIENCES CONVENTION**

(EXHIBITION OF PRODUCTS, NEW TECHNOLOGIES AND SERVICES)

The Cuban Geological Society (SCG) is inviting scientists, professionals, technicians, and university students of Geology, Geophysics, and Mining and related Geosciences, to participate in the VII Earth Sciences Convention, to be held at the International Conference Center in Havana, Cuba on April 3-7, 2017.

For further information, please contact: www.scg.cu; www.cubacienciasdelatierra.com; geociencias@mnhnc.inf.cu Please see attached flier.

---

**PUPS**

Purdue University Planetary Science

There is a new student club called PUPS (Purdue University Planetary Science)–to provide a sense of community for students who are interested in planetary sciences, as well as, providing encouragement and information about the future of planetary science. The goal is to increase awareness of and the interdisciplinary nature of planetary sciences.

Advisor: Briony Horgan.
E-mail: briony@purdue.edu

---

**DISTINGUISHED LECTURES**

Arvind Varma
R. G. Slayter Distinguished professor of Chemical Engineering
Monday, October 31, 2016
2:30 PM
Fowler Hall (Stewart Center)

Jian-Kang Zhu
Distinguished professor of Plant Biology, Departments of Horticulture and Landscape Architecture, and Biochemistry
Monday, October 31, 2016
3:30 PM
Fowler Hall (Stewart Center)

Lectures are free and open to the public. Please see attached fliers for more details.

---

**THE PRESIDENTIAL LECTURE SERIES**

2003 World Food Prize Laureate
Catherine Bertini

President Mitch Daniels will lead an hour-long discussion with Catherine Bertini, including an audience Q&A session.

Wednesday, November 2, 2016
DATAFLOW SUPER COMPUTING WORKSHOP
Hosted by: Profs. Arun Prakash and Ayhan Irfanoglu (Civil Engineering)

Tuesday, November 15, 2016
HAMP 3144 Computing lab

They invite all CSE and CLS faculty, students and staff to attend the short course on ‘DataFlow Supercomputing’ being offered on campus at Purdue by Professor Veljko Milutinovic from University of Belgrade on Tuesday, Nov 15, 2016. Data-flow computers, compared to conventional control-flow computers, offer speedups of 20 to 200 times (even 2000 times for some applications!), and power and size reductions by factors of up to 1/20. Please see the attached flier for more details about this computing paradigm and the workshop. They encourage participants interested in the workshop to register for it by adding their names to the following ‘Google Docs’ link:
https://docs.google.com/spreadsheets/d/1YwO_XhBOziu1Cbd4imlW5hluhjLBXagj_CXZeCa3c9Q/edit?usp=sharing

Please see attached flier for more details.
will be notified of the decision on your proposal by 11/4/16.

Presenters will need to register for the conference at: https://goo.gl/5KbfKP

---

NEW UNDERGRAD CERTIFICATE IN ENVIRONMENTAL AND SUSTAINABILITY STUDIES

Learn more about a new undergraduate certificate in environmental and sustainability studies being planned by an interdisciplinary group, facilitated by the Center for the Environment.

Date: Wed, Nov 2, 2016
4:30 - 5:20 pm
Location: LILY 3102

After a short presentation on the current plans for the certificate by members of the working group, they will have a Q&A session for students and faculty about the latest draft proposal (attached) for the certificate.

Please see attachment for more details.

---

BIG DATA RESEARCH WITH HADOOP AND SPARK FOCUS OF PURDUE, NATIONAL SCIENCE FOUNDATION WORKSHOP NOVEMBER 1

For faculty, staff and students looking to learn more about tools for working with large sets of data. The mini course will include an introduction to big data and hands-on exercises with Hadoop and Spark, as well as an overview of related XSEDE computing resources. Participants should bring a laptop and be able to write C or Fortran in a Linux environment and to use a UNIX text editor such as vi or Emacs.

Questions: rcac-help@purdue.edu.

Adrienne Hunacek Miller, technology writer
Information Technology at Purdue (ITaP)
765-496-8204

---

IMPORTANT NOTICE ABOUT THIS NEWSLETTER

This newsletter is used as the primary information source for current and upcoming events, announcements, awards, grant opportunities, and other happenings in our department and around campus. Active links to additional information will be provided as needed. Individual email announcements will no longer be sent unless the content is time-sensitive. We will continue to include our publications, presentations and other recent news items as well.

Those using paper copies of the newsletter should go to our newsletter archive on the EAPS website at http://www.eaps.purdue.edu/news/newsletters.html and Click on News to access active links as needed. Material for inclusion in the newsletter should be submitted to Fallon McQuem (fmcquem@purdue.edu) by 5:00pm on Thursday of each week for inclusion in the Monday issue.

If it is in the newsletter, we assume you know about it and no other reminders are needed. For answers to common technology questions and the latest updates from the EAPS Technology Support staff, please visit: http://www.eaps.purdue.edu/resources/information_technology/index.htm

---

http://www.eaps.purdue.edu/
9th Annual PURDUE RECEPTION at the AGU Fall Meeting

Thursday, December 15
7:00 PM - 9:00 PM

ThirstyBear Restaurant, Billar Room
661 Howard Street, San Francisco

Complimentary heavy hors d'oeuvres

Co-sponsored by:
Department of Earth, Atmospheric, and Planetary Sciences (EAPS)
and
Purdue Climate Change Research Center (PCCRC)
Sept. 1  Joel Saylor, University of Houston  Host: Ridgway
“Integrating Stable Isotopes and Basin Analysis for a Paleogene-
Neogene Paleoelevation History of Southern Peru”

Sept. 8  William McKinnon, Washington University in St. Louis  Host: Melosh
“Pluto Revealed! Results from NASA’s New Horizons Mission”

Sept. 13  Wanchen Wu, PhD Candidate  Advisor: Tung
“The Effects of Continental Aerosols on the Eyewall of a Typhoon”

Sept. 15  Peter Colarco, NASA Goddard Space Flight Center  Host: Harshvardhan
“Aerosol Modeling Applications in the NASA GEOS-5 Earth
System Model”

Sept. 22  Oliver Boyd, U.S. Geological Survey  Host: Gilbert/Freed
“Seismic Hazard and Geodesy in the New Madrid Seismic Zone”

Sept. 27  Sarah Bischoff, PhD Candidate  Advisor: Flesch
“Breaking Down the Impact of Strength Heterogeneity on Deformation
of the India-Eurasia Collision: A Numerical Modeling Approach”

Sept. 29  Kevin Reed, SUNY-StonyBrook  Host: Chavas
“High-resolution Global Simulations from Reduced Complexity
to Future Projections”

Oct. 4  Wendell Walters, PhD Candidate  Advisor: Flesch
“Unraveling the “Fingerprints” of Nitrogen Oxides using Stable Isotopes:
Implications for Source Partitioning and Evaluation of Atmospheric
Oxidation Pathways”

Oct. 20  Fan-Chi Lin, University of Utah  Host: Nowack
“Imaging the Yellowstone Magmatic and Hydrothermal System
Using Seismic Tomography”

Oct. 25  Logan Dawson, PhD Candidate  Advisor: Baldwin
“Examination of Mesoscale Feedbacks on Convective Scale
Predictability During MPEX”

Oct. 27  Allison Wing, Lamont-Doherty Earth Observatory  Host: Chavas
“Clouds, Circulation, and Climate Sensitivity in Cloud Resolving
Model Simulations of Self-Aggregation of Convection”

Nov. 1  Shaoqing Liu, PhD Candidate  Advisor: Zhuang
“Quantifying Terrestrial Ecosystem Carbon Dynamics with
Mechanistically-based Biogeochemistry Models and In Situ and
Remotely Sensed Data”
Nov. 3  Kristin Morell, University of Victoria  Host: Elliott
“Lessons in the Landscape: Mountain Building and Seismic Hazards in Cascadia and the Himalaya”

Nov. 10  Jessica Larsen, University of Alaska, Fairbanks  Host: Elliott

Nov. 15  Adam Stepanek, PhD Candidate  Advisor: Baldwin
“Predictions of Severe Weather Environments by the Climate Forecast System Version 2 Model Suite”
**Tuesday, 4:00PM, Room 2201/HAMP**

Nov. 17  Michael King, LASP  Host: Harshvardhan
“Spatial and Temporal Distribution of Tropospheric Clouds Observed by MODIS on Board the Terra and Aqua Satellites”

Nov. 28  Tim Marshall, Haag Engineering  Host: Tanamachi
“El Reno Tornado and Damage Survey”
**Monday, 3:30PM, Room 2108/HAMP**

Dec. 1  Andy Davis, University of Chicago  Host: Caffee
“Stardust in the Laboratory with CHILI”

Dec. 6  Christy Gibson, PhD Candidate  Advisor: Filley
“ ”
**Tuesday, 4:00PM, Room 2201/HAMP**
Quantifying Terrestrial Ecosystem Carbon Dynamics with Mechanistically-Based Biogeochemistry Models and In Situ and Remotely Sensed Data

Shaoqing Liu
PhD Candidate

Terrestrial ecosystem absorbs around one-third CO2 emissions from anthropogenic activities and its feedback would have a large impact on the global climate system. Therefore, it is important to accurately quantify the regional/global carbon dynamics in terrestrial ecosystems given the predicted continuous increasing greenhouse gas emissions in future. There are two widely used methods to quantify regional/global carbon dynamics: upscaling approaches based on Fluxnet and process-based ecosystem models. Although the upscaling method based on FLUXNET network has provided us the spatial and temporal pattern of the carbon fluxes and can serve as the benchmark products for the ecosystem modeling community, it fails to consider the atmospheric CO2 effect given its important physiological role in carbon assimilation. The process-based ecosystem models are useful tools to predicting future change in the terrestrial ecosystem. However, they suffer the great uncertainty induced by model structure and parameters. In this talk, I will first evaluate the atmospheric CO2 effects on the regional gross primary productivity (GPP) and net ecosystem exchange (NEE) estimation using FLUXNET and machine learning algorithms. Second, I will use the leaf stable carbon isotope composition to constrain the carbon dynamics by using process-based ecosystem models. Finally, the tree ring data will be explored to drive the regional water use efficiency (WUE) variation and estimate the inter-annual GPP in boreal forest since tree ring isotopic record has great advantage to address plant response to long term environmental variations compared with the land surface models and manipulative experiments.
Abstract: The extraction of natural gas from unconventional shale plays, and oil from shale and tight oil plays, using hydraulic fracturing has added significantly to USA’s hydrocarbon production and reserves in recent years. At the same time, concerns have been raised in the media regarding the environmental consequences of such practices. This has led to an ongoing debate among stakeholders as to the true nature of shale gas and oil development: is it an energy supply game changer, or an environmental quagmire?

In the first part of this talk, I will provide an overview of various issues related to shale gas and oil development, i.e., contributions to energy supply, operational aspects of hydraulic fracturing, and assessment of potential environmental hazards. In the second part, I will focus on some of our recent research on the topics of production data analysis and analytics, enhanced oil recovery, and induced seismicity risk from fracturing and/or wastewater disposal. Finally, I will present a vision for advancing scientific know-how and practical understanding of energy-environment nexus issues related to sustainable and safe development of unconventional energy resources.
Lessons in the Landscape: Mountain Building and Seismic Hazards in Cascadia and the Himalaya

Kristin Morell
University of Victoria

In my talk I will show two examples of how the morphology of the Earth’s surface can teach us about seismic hazards and about how deformation is accommodated within the crust. I will specifically provide two examples, one from the Cascadia subduction zone on Vancouver Island and the second from a region of NW India within the core of the Himalayan mountain range. In the Himalayas, I will show how river morphology, topography and erosion rate data can elucidate the geometry of the same seismogenic fault that ruptured during the devastating April 2015 Gorkha earthquake. In northern Cascadia on Vancouver Island, I will show how high-resolution lidar topography, detailed field work and paleoseismic trenching reveal evidence for a previously unidentified shallow active fault beneath the city of Victoria, British Columbia. I will argue that in both of these areas, identifying links between tectonics and the surface allows us to understand seismic hazards in a way that would not be possible otherwise.
Earth Science Passport Day

Who: Kids ages 5 to 9
When: Saturday November 5, 10am-2pm
Where: Imagination Station
       600 N 4th St, Lafayette, IN

Earth Science Passport Day Educators:
• EAPS Graduate Students and Faculty
• Members of PUGS, PUMA, & PUPS

Details: A series of Earth Science themed stations aimed at practicing science skills (observing, classifying, inferring) and learning the wonders of earth science. As participants complete the stations recording data in their passport they will collect stamps towards becoming a junior EAPS student and collecting souvenirs.

For more information or to sign up, contact
Christopher Roemmel (croemmel@purdue.edu)
Mariah Romero (mariahc.romero@gmail.com)
Jenny Newall (jnewall@purdue.edu)
In 2012, the University created a performance evaluation policy for staff which included a focus on capturing the professional development activities of staff throughout the year. The College of Science firmly believes that participation in professional development provides long lasting benefits to both the individual staff member and their department. As such, the College desires to support these activities.

**College of Science Professional Development Philosophy:**

- Professional development participation should be available to all full- or part-time, permanent staff—clerical, service, administrative/professional and managerial/professional.
- Professional development should focus on developing skills that will prepare staff to advance at Purdue or to perform their current duties more effectively.
- All supervisors are strongly encouraged to allow appropriate amounts of time for each staff person throughout the year to attend trainings that will help them accomplish their professional development goals. Approval for participation in such activities should be based on the business needs of each area.

**College of Science Professional Development Fund:**

In order to support staff professional development activities, the College has created a Professional Development Fund to financially assist with participation in trainings that involve fees or the purchase of training materials.

*Professional Development Fund Guidelines:*

- Professional Development funds are to be used to support College of Science staff’s participation in activities that will assist them in developing skills that will prepare staff to advance at Purdue or to perform their current duties more effectively.
- Award applications will be requested three times annually with approximately 10 awards per call. Funds requested may be used to defray costs associated with attending professional meetings or seminars, to participate in workshops, or to enroll in professional-oriented courses related to employment responsibilities. The funds must be utilized within two application cycles (Spring awards utilized by the end of Fall, etc.).
- Applications for amounts of up to $1000 will be accepted.
- Individuals are eligible for one award per calendar year.

*Application Deadlines:*

- Spring Application Call – application due by first Monday in October; decisions made by November 30
- Summer Application Call – application due by first Monday in March; decisions made by April 30
- Fall Application Call – application due by first Monday in June; decisions made by July 31
We are still accepting applications for Winter-break 2016!

**ECOSYSTEM Field Studies**

**WINTER BREAK 2016-17 FOR STUDENTS**

**CARIBBEAN ECOSYSTEM FIELD STUDIES**

Click to Download: EcoFS 2016-17 Course Announcement (PDF)

Approved Course: Caribbean Ecosystem Field Studies
Please Distribute This Winter-Break 2016-17 Session Flyer

Can you please help me by distributing this flyer or the below information to students who may be interested? Or, feel free to forward this on to anyone who may be interested.

We are accepting applications for our winter-break field course: Caribbean Ecosystem Field Studies. This course (ENST 391) is approved for 3 undergraduate semester credits through the Environmental Studies Program of the University of Montana at Missoula and is open to students in an ecosystem related department or major.

Thank you for considering to make this rewarding field opportunity available to your students. This is our 10th year of programming to over 450 satisfied students and we hope to serve some of yours. Please email me with any questions.

Thank you!
- Prof. Steve Johnson
Copy/Paste Text Version Below:

WINTER-BREAK 3-CREDIT FIELD COURSE OPPORTUNITY!
Caribbean Ecosystem Field Studies - Full Details - http://www.ecofs.org

- Study, snorkel & SCUBA dive along the Caribbean coast of Mexico *
  December 28, 2016 - January 16, 2017

An opportunity to apply your classroom & textbook learning while immersed in an incredible marine ecosystem setting!

- Gain valuable career skills in hands-on scientific field research *
- Earn 3 undergraduate transfer credits *
- SCUBA and snorkel daily to study the coral reef ecosystem *

Open to students from all universities & majors | Accredited by the University of Montana at Missoula's Environmental Studies | Program: ENST 391- for 3 undergraduate semester transfer credits.

Direct questions to Professor Steve Johnson, Course Director at steve@EcoFS.org

Ecosystem Field Studies
303-859-0173 | steve@ecofs.org | Visit Our Site

Ecosystem Field Studies, PO Box 1967, Boulder, CO 80305
SafeUnsubscribe™ barbara@purdue.edu
SELECTED TOPICS RELATED TO ENERGY AND CHEMICALS

Arvind Varma
R. Games Slayter Distinguished Professor of Chemical Engineering

Selected research to produce energy carriers and valuable chemicals from new or renewable sources, currently being conducted or recently completed in my laboratory, will be discussed.

- Hydrogen generation for PEM fuel cell vehicle applications
- Catalytic upgrading of bio-oils
- Utilization of glycerol, a biodiesel waste product, for production of valuable chemicals
- Oxidative coupling of methane

The research relies on development of new catalytic materials and/or processes and demonstrates successful applications of the principles of chemical and catalytic reaction engineering to solve problems of contemporary interest facing society.

Monday, October 31, 2016

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>RECEPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 p.m.</td>
<td>2:30 p.m.</td>
</tr>
<tr>
<td>Fowler Hall</td>
<td>Robert L. Ringel Gallery</td>
</tr>
<tr>
<td>Stewart Center</td>
<td>Stewart Center</td>
</tr>
</tbody>
</table>

Lecture is free and open to the public.
Certificate in Environmental and Sustainability Studies Plan of Study
Draft 10.22.16

Draft of Mission Statement

The Certificate in Environmental and Sustainability Studies (CESS) will give students working in multiple disciplines across Purdue a broad exposure to how environmental and sustainability challenges and solutions are conceived, represented, and researched in the Humanities, Social Sciences, Agriculture, and STEM disciplines. The CESS program will introduce students to a wide range of environmental issues from diverse perspectives so that they may more thoroughly comprehend and critically evaluate today’s environmental and sustainability challenges.

Draft of Learning Outcomes

Students acquiring the Certificate in Environmental and Sustainability Studies (CESS) will be expected to achieve the following learning outcomes:

1) KNOWLEDGE: Students will be able to identify, describe, and relate the diverse causes (social, cultural, political, economic, historical, scientific) and consequences of pressing environmental and sustainability challenges, such as climate change, resource scarcity, biodiversity, population growth).

2) COMPREHENSION: Students will be able to distinguish, paraphrase, and translate different disciplinary perspectives on these key environmental and sustainability challenges.

3) ANALYSIS: Students will familiarize themselves with the efficacies, and learn to push the boundaries, of different disciplinary approaches by comparing and contrasting solutions to environmental issues (scientific, technical, engineered, social, economic, historic, and ethical components).

4) SYNTHESIS: Students will learn to combine different disciplinary approaches by synthesizing, reorganizing, and reformulating diverse viewpoints.

5) APPLICATION: Students will demonstrate ability to communicate across disciplines on environmental and sustainability problems through the production of appropriate interdisciplinary instructional assignments. Students will illustrate their diversity of knowledge by applying their work in multi-disciplinary teams on sustainability challenges.

6) EVALUATION: Students will estimate the efficacy of different disciplinary approaches through assessing that efficacy in real-world applications.
Preliminary Draft Plan of Study

Summary

1) Required 3-credit course: Core Concepts in Environmental and Sustainability Studies. (New, team-taught interdisciplinary course introducing diverse perspectives on Environment and Sustainability problems, and skills in interdisciplinary communication and teamwork. This would be an annual course, offered every year starting in fall 2017).

2) Required 9 additional credits: 3 additional courses required from selection of existing or new classes across departments in three categories:

   • Social, Economic, and Political Dimensions
   • Stewardship, Conservation, and Management Dimensions
   • Science, Engineering, and Technological Dimensions

   One course required from each area. The plan is for these courses to be able to count for both the certificate and other existing academic requirements.

3) Program to be administered by Discovery Park Center for the Environment, in consultation with sponsor college (CLA), following administrative model of Burton Morgan Center Certificate in Entrepreneurship.

Detailed Course Options

Students participating in the Certificate in Environmental and Sustainability Studies are required to complete at least one course under each of the following three categories. By doing so, students will learn about the diversity of causes and consequences of environmental and sustainability challenges, and about the different disciplinary approaches to addressing these issues.

A preliminary list of courses that count towards each category is provided on the following page. Other courses may be counted, with the approval of the certificate administrator, provided that they meet the criteria defining one of the categories.

Category 1: Social, Economic, and Political Dimensions

This category emphasizes how knowledge of human behavior furthers our understanding of environmental and sustainability impacts. It includes courses that examine human interaction with the environment on a range of scales, from individual decision-making to regional, national, or global institutions. Courses relate to environmental outcomes and sustainability, focusing on economics; ethics and values;
individual and societal behaviors and interactions; and politics, policy analysis, or decision-making.

Category 2: Stewardship, Conservation, and Management Dimensions

This category focuses on the application of sustainability or environmental principles to planning and managing human interactions with the environment. This may include courses relate to conservation biology; natural resource management; population and community ecology; restoration of ecosystem services; land use and urban planning; sustainable agriculture; and climate change adaptation or mitigation.

Category 3: Science, Engineering, and Technological Dimensions

This category focuses on the scientific and technological tools needed to understand and address environmental and sustainability challenges, particularly in the engineered and built environment. This may include coursework related directly to basic and applied ecology and environmental science, the development of emerging technologies for renewable energy, energy efficiency, or sustainable construction; it may also include instruction in systems analysis tools with applications to environmental or sustainability challenges, such as integrated assessment modeling or lifecycle assessment, or study of interactions between the environment and infrastructure.

Courses qualifying for each category:

Category 1: Social, Economic, and Political Dimensions

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Department</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE 32500</td>
<td>Agriculture</td>
<td>Soil and Water Resource Engineering</td>
</tr>
<tr>
<td>AD 39700</td>
<td>Liberal Arts</td>
<td>Sustainability in the Built Environment</td>
</tr>
<tr>
<td>AGEC 20400</td>
<td>Agriculture</td>
<td>Introduction to Resource Economics &amp; Env Policy</td>
</tr>
<tr>
<td>AGEC 25000</td>
<td>Agriculture</td>
<td>Economic Geography of World Food and Resources</td>
</tr>
<tr>
<td>AGEC 40600</td>
<td>Agriculture</td>
<td>Natural Resource &amp; Environmental Economics</td>
</tr>
<tr>
<td>AGEC 52500</td>
<td>Agriculture</td>
<td>Environmental Policy Analysis</td>
</tr>
<tr>
<td>ANTH 23500</td>
<td>Liberal Arts</td>
<td>Great Apes and Conservation</td>
</tr>
<tr>
<td>ANTH 31300</td>
<td>Liberal Arts</td>
<td>Archaeology of North America</td>
</tr>
<tr>
<td>ANTH 32700</td>
<td>Liberal Arts</td>
<td>Environment and Culture</td>
</tr>
<tr>
<td>ANTH 33500</td>
<td>Liberal Arts</td>
<td>Primate Behavior</td>
</tr>
<tr>
<td>ANTH 37700</td>
<td>Liberal Arts</td>
<td>Anthropology of Hunter-Gatherer Societies</td>
</tr>
<tr>
<td>ANTH 37900</td>
<td>Liberal Arts</td>
<td>Native American Cultures</td>
</tr>
<tr>
<td>ANTH 59200</td>
<td>Liberal Arts</td>
<td>GIS for Social Scientists</td>
</tr>
<tr>
<td>CE 59700</td>
<td>Engineering</td>
<td>Dynamics of Social-Ecological and Technological Systems</td>
</tr>
<tr>
<td>EAPS 36000</td>
<td>Science</td>
<td>Great Issues in Science and Society</td>
</tr>
<tr>
<td>ENG 23400</td>
<td>Liberal Arts</td>
<td>Ecological Literature</td>
</tr>
<tr>
<td>ENG 34100</td>
<td>Liberal Arts</td>
<td>Humans, the Environment, and the End(s) of Nature</td>
</tr>
<tr>
<td>Code</td>
<td>Department</td>
<td>Course Title</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>ENG 41200</td>
<td>Liberal Arts</td>
<td>Literature, Science, and Climate Change</td>
</tr>
<tr>
<td>ENG 41400</td>
<td>Liberal Arts</td>
<td>The Aesthetics and Politics of Climate Change in Film</td>
</tr>
<tr>
<td>ENG 59600</td>
<td>Liberal Arts</td>
<td>Environmental Ethics: The Human in the Anthropocene</td>
</tr>
<tr>
<td>ENG 59600</td>
<td>Liberal Arts</td>
<td>Ecocriticism and Postcolonialism</td>
</tr>
<tr>
<td>FNR 36500</td>
<td>Agriculture</td>
<td>Natural Resources Issues, Policy, and Administration</td>
</tr>
<tr>
<td>FNR 48800</td>
<td>Agriculture</td>
<td>Global Environmental Issues</td>
</tr>
<tr>
<td>IE 59000</td>
<td>Engineering</td>
<td>Quantitative Analysis for Climate Change Policy</td>
</tr>
<tr>
<td>PHI 11400</td>
<td>Liberal Arts</td>
<td>Global Moral Issues</td>
</tr>
<tr>
<td>PHIL 29000</td>
<td>Liberal Arts</td>
<td>Environmental Ethics</td>
</tr>
<tr>
<td>POL 22300</td>
<td>Liberal Arts</td>
<td>Introduction to Environmental Policy</td>
</tr>
<tr>
<td>POL 32700</td>
<td>Liberal Arts</td>
<td>Global Green Politics</td>
</tr>
<tr>
<td>POL 52300</td>
<td>Liberal Arts</td>
<td>Environmental Politics &amp; Public Policy</td>
</tr>
<tr>
<td>SOC 53300</td>
<td>Liberal Arts</td>
<td>Environmental Sociology</td>
</tr>
</tbody>
</table>

**Category 2: Stewardship, Conservation, and Management Dimensions**

<table>
<thead>
<tr>
<th>Code</th>
<th>Department</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRY 29000</td>
<td>Agriculture</td>
<td>Introduction to Environmental Science</td>
</tr>
<tr>
<td>BTNY 21100</td>
<td>Agriculture</td>
<td>Plants and the Environment</td>
</tr>
<tr>
<td>CE/EEE 35500</td>
<td>Engineering</td>
<td>Engineering Environmental Sustainability</td>
</tr>
<tr>
<td>EAPS 11300</td>
<td>Science</td>
<td>Introduction to Environmental Science</td>
</tr>
<tr>
<td>EAPS 32700</td>
<td>Science</td>
<td>Climate, Science and Society</td>
</tr>
<tr>
<td>FNR 10300</td>
<td>Agriculture</td>
<td>Introduction to Environmental Conservation</td>
</tr>
<tr>
<td>FNR 37500</td>
<td>Agriculture</td>
<td>Human Dimensions of Natural Resource Management</td>
</tr>
<tr>
<td>FNR 40800</td>
<td>Agriculture</td>
<td>Natural Resources Planning</td>
</tr>
<tr>
<td>FNR 47000</td>
<td>Agriculture</td>
<td>Fundamentals of Planning</td>
</tr>
<tr>
<td>HORT 42200</td>
<td>Agriculture</td>
<td>Vegetable and Herb Production</td>
</tr>
<tr>
<td>HORT 44200</td>
<td>Agriculture</td>
<td>Sustainability in the Managed Landscape</td>
</tr>
<tr>
<td>HTM 37000</td>
<td>HHS</td>
<td>Sustainable Tourism And Responsible Travel</td>
</tr>
<tr>
<td>MET 42400</td>
<td>Polytechnic</td>
<td>Green Processes and Sustainability</td>
</tr>
<tr>
<td>NRES 45000</td>
<td>Agriculture</td>
<td>Soil Conservation &amp; Water Management</td>
</tr>
<tr>
<td>TECH 52200</td>
<td>Polytechnic</td>
<td>Sustainability Foundations</td>
</tr>
</tbody>
</table>

**Category 3: Science, Engineering, and Technological Dimensions**

<table>
<thead>
<tr>
<th>Code</th>
<th>Department</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE 32500</td>
<td>Agriculture</td>
<td>Soil and Water Resource Engineering</td>
</tr>
<tr>
<td>AGEC 59600</td>
<td>Agriculture</td>
<td>Global Change &amp; the Challenge of Sustainably Feeding a Growing Planet</td>
</tr>
<tr>
<td>AGRY 28500</td>
<td>Agriculture</td>
<td>World Crop Adaptation and Distribution</td>
</tr>
<tr>
<td>ASM 33600</td>
<td>Agriculture</td>
<td>Environmental Systems Management</td>
</tr>
<tr>
<td>BCM 41900</td>
<td>Polytechnic</td>
<td>Sustainability Construction</td>
</tr>
<tr>
<td>BIOL 48300</td>
<td>Science</td>
<td>Environmental &amp; Conservation Biology</td>
</tr>
<tr>
<td>BTNY 21100</td>
<td>Agriculture</td>
<td>Plants and the Environment</td>
</tr>
<tr>
<td>CE/EEE 35500</td>
<td>Engineering</td>
<td>Engineering Environmental Sustainability</td>
</tr>
<tr>
<td>CE 49700</td>
<td>Engineering</td>
<td>Community Resilience: From Urban to Rural</td>
</tr>
<tr>
<td>Course Code</td>
<td>Department</td>
<td>Subject Area</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>EAPS 10000</td>
<td>Science</td>
<td>Planet Earth</td>
</tr>
<tr>
<td>EAPS 32000</td>
<td>Science</td>
<td>Physics of Climate</td>
</tr>
<tr>
<td>EAPS 37500</td>
<td>Science</td>
<td>Great Issues: Fossil Fuels, Energy &amp; Society</td>
</tr>
<tr>
<td>EAPS 52700</td>
<td>Science</td>
<td>Principles of Terrestrial Ecosystem Ecology</td>
</tr>
<tr>
<td>EAPS 52900</td>
<td>Science</td>
<td>Modeling Ecosystems and Biogeochemical Cycles</td>
</tr>
<tr>
<td>EAPS 58400</td>
<td>Science</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>EEE 43000</td>
<td>Engineering</td>
<td>Industrial Ecology &amp; Life Cycle Analysis</td>
</tr>
<tr>
<td>FNR 10300</td>
<td>Agriculture</td>
<td>Introduction to Environmental Conservation</td>
</tr>
<tr>
<td>FNR 12500</td>
<td>Agriculture</td>
<td>Environmental Science and Conservation</td>
</tr>
<tr>
<td>FNR 21000</td>
<td>Agriculture</td>
<td>Natural Resource Information Management</td>
</tr>
<tr>
<td>FNR 35700</td>
<td>Agriculture</td>
<td>Fundamental Remote Sensing</td>
</tr>
<tr>
<td>FNR 35900</td>
<td>Agriculture</td>
<td>Spatial Ecology and GIS</td>
</tr>
<tr>
<td>FNR 47000</td>
<td>Agriculture</td>
<td>Fundamentals of Planning</td>
</tr>
<tr>
<td>HTM 37000</td>
<td>Health &amp; Human Sciences</td>
<td>Sustainable Tourism And Responsible Travel</td>
</tr>
<tr>
<td>MET 42400</td>
<td>Polytechnic</td>
<td>Green Processes and Sustainability</td>
</tr>
<tr>
<td>NRES 30500</td>
<td>Agriculture</td>
<td>Environmental Decision Making</td>
</tr>
<tr>
<td>PHYS 49000</td>
<td>Science</td>
<td>Sustainable Energy Sources</td>
</tr>
<tr>
<td>TECH 52400</td>
<td>Polytechnic</td>
<td>Sustainability Analysis Assessment</td>
</tr>
<tr>
<td>TECH 52300</td>
<td>Polytechnic</td>
<td>Sustainable Critical Infrastructures</td>
</tr>
</tbody>
</table>
DataFlow SuperComputing

This course presents the DataFlow SuperComputing paradigm, defines its advantages and sheds light on the related programming model with hands-on coding experience. DataFlow computers, compared to ControlFlow computers, offer speedups of 20 to 200 (even 2000 for some applications), and power and size reductions of up to 1/20. However, the programming paradigm is different, and has to be mastered. The course explains the paradigm of programming in space, using Maxeler (a provider of multiscale dataflow computing systems) as an example, and gives an overview of ongoing research in the field. Examples include DataEngineering, DataMining, FinancialAnalytics, ImageProcessing, etc. The course also covers advanced DataFlow issues like: Compilation, OS, and methods for speed-up maximization, using tools like WebIDE and MaxIDE. DataFlow potentials are discussed through the notions introduced by four Nobel Laureates: Richard Feynman, Ilya Prigogine, Daniel Kahneman, and Andre Geim.

Registration: Please sign-up online at the following Google Docs link: https://docs.google.com/spreadsheets/d/1YwO_XhBOziu1Cbd4imlWShIuhJLBXagj_CXZEca3c9Q/edit?usp=sharing

Location & Schedule: HAMP-3144 Computing Lab:
Nov 15 (Tue) 9:00am - 10:00am: Introduction to DataFlow Computing
10:00am - 11:00am: Concepts of DataFlow Computing
11:00am - 12:00pm: Applications of DataFlow Computing
12:00pm - 1:00pm: Break
1:00pm - 2:00pm: Details of Programming in Space
2:00pm - 3:00pm: Selected Examples and Class Projects
3:00pm - 4:00pm: Advanced Issues and Open Research Problems

Supplementary Events: HAMP-4114:
Nov 16 (Wed) 1:00pm - 5:00pm: Office Hours
Nov 17 (Thu) 1:00pm - 5:00pm: Analysis of Class Projects and Joint Research (maxeler.mi sanu.ac.rs)
Nov 18 (Fri) 1:00pm - 5:00pm: Discussion of Research Projects (appgallery.maxeler.com)

Interesting Facts and Links:
- A recent study from Tsinghua University in China reveals that, for Shallow Water Weather Forecast, which is a BigData problem, on the 1U level, the Maxeler DataFlow machine is 14 times faster than the Tianhe machine. Tianhe is rated #1 on the Top 500 list of fastest computers (based on Linpack, which is a smalldata benchmark).
- Maxeler resources: https://appgallery.maxeler.com and https://webide.maxeler.com

References:

About the speaker:
Prof. Veljko Milutinovic received his PhD from the University of Belgrade, spent about a decade on various faculty positions in the USA (mostly at Purdue University), and was a co-designer of the DARPA’s first GaAs RISC microprocessor. Later he taught and conducted research at the University of Belgrade in Serbia, in EE and MATH. Now he serves as the Chairman of the Board of the Maxeler operation in Serbia. His research is mostly in datamining and dataflow computing, with the emphasis on algorithms and mappings of algorithms onto architectures. His co-authored paper on matrix multiplication for dataflow received “The IET Premium Award for 2014” (meaning the single best paper in IET Computing for 2012 and 2013). His paper on the research methodology was published in an ASCE journal and also received a Premium Award for 2014. He is a Fellow of the IEEE and a Member of Academia Europaea. He has over 40 IEEE or ACM journal papers, over 400 Thomson-Reuters citations, and about 4000 Google Scholar citations (including those that miss-spell his name :).
Some heritable information is not in the DNA sequence of organisms but is contained in the patterns of their DNA methylation. What is DNA methylation and why do we need to know about it?
As head of the World Food Program from 1992-2002, Catherine Bertini led the U.N. response to food crises in North Korea, Afghanistan, Bosnia and Kosovo and was credited with helping to save millions of lives in famine-stricken regions. She was appointed humanitarian envoy to the Horn of Africa, Gaza and the West Bank by U.N. Secretary-General Kofi Annan and named one of the world’s most powerful women by The Times of London in 2001.
The Cuban Geological Society (SCG) is pleased to invite scientists, professionals, technicians and university students of Geology, Geophysics, Mining and related Geosciences, to participate in the VII Earth Sciences Convention, and Exhibition of Products, New Technologies and Services, to be held at the International Conference Center of Havana, Cuba on April 3-7, 2017.

The convention welcomes presentations about Cuba, the Caribbean and other regions or in general about the geology, geophysics and mining experiences in the search and management of natural resources, including minerals (metals, industrial), water, oil and gas, construction, earthquake research and other geohazards, education of geosciences; as well as any other related to the sustainable exploitation of natural resources.

We invite professional societies, institutions and non-government organizations to organize workshops, round tables and meetings during the Convention.

www.scg.cu; www.cubacienciasdelatierra.com
geociencias@mnhnc.inf.cu
Hello, we’d like to take this time to update you on Writing Lab news.

We now offer online appointments for clients, who can easily schedule one-to-one consultations at https://cla.purdue.edu/wlschedule. Clients can select convenient times and choose one of our highly trained consultants for face-to-face or online feedback.

In addition, we’ve been working with Purdue’s Institutional Research office to learn more about Writing Lab users. Our initial results indicate that when students have sessions with tutors in the Writing Lab, especially those who are enrolled in English 106, they have significantly higher semester GPAs than their peers who do not come to the Writing Lab.

We are always looking for ways to collaborate with faculty to support writers across disciplines. If you’d like to discuss how we can work with you and your students, please contact us.

Best wishes for a great semester.

Harry C. Denny, Ph.D. • hdenny@purdue.edu
Associate Professor of English and Writing Lab Director

Tammy Conard-Salvo • tcsalvo@purdue.edu
Associate Director

---

**What appointment options do you offer?**

Students can choose from three appointment types for one-to-one consultations:

- **In-person:** students meet face-to-face with one of our tutors in the Writing Lab or a satellite location.
- **Online:** Students can discuss their work with a tutor in real time using a text-based chat interface.
- **eTutoring:** Also known as asynchronous tutoring, students upload their documents in advance and receive comments at the appointed time.

**More online at** [owl.english.purdue.edu/writinglab/facultyfaq](owl.english.purdue.edu/writinglab/facultyfaq)

---

**Main Location**

Heavilon Hall Room 226
Monday – Thursday 9:00 AM – 6:00 PM
Fridays 9:00 AM – 1:00 PM
Appointments: [https://cla.purdue.edu/wlschedule](https://cla.purdue.edu/wlschedule)

**Satellite Locations**

- **HSSE Library Collaborative Study Center**
  Mondays 6:00 – 9:00 PM
- **Latino Cultural Center**
  Tuesdays 6:00 – 9:00 PM
- **Mechanical Engineering (ME) 2nd Floor**
  Rooms 2138 & 2142
  Wednesdays 6:00 – 9:00 PM

---

**Writing Lab services are FREE and available to all Purdue students, faculty, and staff.**

Heavilon Hall Room 226 • (765) 494-3723 • [https://owl.english.purdue.edu/writinglab](https://owl.english.purdue.edu/writinglab)

@PurdueWLab • [PurdueUniversityWritingLab](https://twitter.com/PurdueUniversityWritingLab)
One-on-One Tutorials
We offer free tutorials on an appointment basis. Writers can bring any document to the Writing Lab, at any stage of the writing process. Sessions commonly help with the following:

- Clarification: understanding an assignment
- Invention: brainstorming, coming up with ideas, discovering a focus
- Organization: ordering ideas, building an argument
- Revision: revising for clarity and coherence

Our graduate tutors can assist students with a variety of writing tasks, including writing in the disciplines. Our business and professional writing consultants are specialists in employment writing, memos, personal statements, and reports. Our undergraduate teaching assistants help students taking first year composition courses (English 106 and 108). All of our tutors undergo rigorous training.

The student FAQs at [https://owl.english.purdue.edu/writinglab/policies](https://owl.english.purdue.edu/writinglab/policies) answer common questions about our tutorial sessions and offer tips on how best to prepare for sessions.

Students can now schedule appointments online. In addition, our satellite locations offer drop-in hours in the evenings at various locations. Please see [https://owl.english.purdue.edu/writinglab](https://owl.english.purdue.edu/writinglab) for hours of operation and location information.

ESL Services
The Purdue Writing Lab offers a range of services to non-native speakers of English, covering writing and reading skills and conversational fluency:

- Tutorials for feedback on writing projects
- Self-study resources (books, CD-ROMs) for language skills practice
- Daily conversation groups (open to all non-native speakers enrolled at Purdue) for improving oral fluency

For more information on in-lab services for ESL learners, see [https://owl.english.purdue.edu/writinglab/esl](https://owl.english.purdue.edu/writinglab/esl).

Course-specific Resources
The Writing Lab is committed to Writing Across the Curriculum at Purdue, and we welcome ideas for collaboration with other disciplines in the university. We encourage you to submit your course syllabus and assignment descriptions to the Writing Lab to help us better assist your students in their tutorials. We are also available to consult with instructors about assigning and responding to student papers, encouraging students’ use of the Writing Lab, and developing ideas for special projects connected with writing. To learn more or request a consultation, visit [https://owl.english.purdue.edu/writinglab/consultation](https://owl.english.purdue.edu/writinglab/consultation).

Experienced tutors are also available to provide your class with interactive presentations on the resources available to students at the Writing Lab. We also offer classroom workshops on writing topics that can be tailored to specific class projects on a limited basis. You can learn more and request a workshop for your class at [https://owl.english.purdue.edu/writinglab/workshops/index.php](https://owl.english.purdue.edu/writinglab/workshops/index.php).

Purdue’s Online Writing Lab (OWL)
The Purdue OWL ([https://owl.english.purdue.edu](https://owl.english.purdue.edu)) offers a wide variety of materials, presentations, and YouTube videos ([https://www.youtube.com/OWLPurdue](https://www.youtube.com/OWLPurdue)) to the Purdue University community and to users around the globe. The Purdue OWL also posts updates on Writing Lab events and produces the Purdue OWL News ([https://owl.english.purdue.edu/purdueowlnews](https://owl.english.purdue.edu/purdueowlnews)). Instructors and students use the OWL to:

- Access regularly-updated handouts on writing process, basic writing, and document design
- Find resources for English as a Second Language students
- Download classroom-ready PowerPoint presentations on a number of writing topics

Heavilon Hall Room 226 • (765) 494-3723 • [https://owl.english.purdue.edu/writinglab](https://owl.english.purdue.edu/writinglab)
@PurdueWLab • [ facebook.com/PurdueUniversityWritingLab ](http://facebook.com/PurdueUniversityWritingLab)