Council for Regulatory Environmental Modeling – Update on Activities and Initiatives

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US Environmental Protection Agency

EPA Region 6 Water Quality Modeling Conference & Workshop
Thursday, November 21, 2013

Overview

- Office of the Science Advisor
  - Council for Regulatory Environmental Modeling
  - Forum on Environmental Measurements
  - Environmental Laboratory Advisory Board
- Modeling Activities and Initiatives
  - Education & Communication
  - Integrated Environmental Modeling
  - Monitoring Inventories & Activities
  - Uncertainty & Variability
- Collaborative Engagement
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Office of the Science Advisor (OSA)

- **OSA Purpose** – To support the Science Advisor's key responsibilities:
  - Advising the EPA Administrator on ongoing and emerging science and technology issues.
  - Coordinating the development of cross-agency science and technology policy solutions.
  - Developing consensus solutions to science and science policy issues.
  - Providing leadership on science and technology integration, direction, and planning.
  - Being a spokesperson for agency science internally and externally.
- **OSA Initiatives** – Science and Technology, Measurement, Monitoring, Modeling, Risk, Human Health, Information Management

Measurement, Monitoring, Modeling (MMM or M^3) Group

- **Council for Regulatory Environmental Modeling (CREM)**
- Environmental Laboratory Advisory Board (ELAB)
- Forum on Environmental Measurements (FEM)
- EPA Global Earth Observations (GEO)
  - Currently inactive

Council for Regulatory Environmental Modeling (CREM)

- **Purpose and Objectives** –
  - Promote scientific integrity and defensibility in modeling principles, practices, and guidance.
  - Encourage quality practices and principles in modeling – consistency and consensus as appropriate among modeling experts, model developers, and model users.
  - Serve as a dynamic forum, actively-sought source of expertise, and central point of contact related to quality assurance, transparency, best practices, interoperability, outreach, and other emerging multi-stakeholder issues.
  - Coordinate with internal and external stakeholders on environmental monitoring, information management, and technology needs to promote the alignment of activities to solve complex environmental modeling issues, address priorities, and leverage resources.

CREM – Areas of Focus

- **Education & Communication** – inventory, collect, distribute, and update modeling education and communication guidance, tools, and other materials.
- **Integrated Modeling** – define 'integrated environmental modeling' (IEM) and create a plan for achieving the desired impacts with IEM.
- **Modeling Inventories & Activities** – determine the appropriate functionalities and metadata scopes of existing EPA model inventories.
- **Uncertainty & Variability** – examine the treatment of uncertainty and variability across disciplines and offices at EPA.

Forum on Environmental Measurements (FEM)

- **Purpose and Scope –** Promote consistency and consensus on measurement, monitoring, and laboratory science issues with multi-program impact through recommendations to guide the measurement community in:
  - Validating and disseminating methods for sample collection and analysis.
  - Ensuring monitoring studies are scientifically rigorous, statistically sound, and representative.
  - Employing a quality systems approach to ensure data gathered/used is of known and documented quality.
  - Promoting development and use of innovative technologies to generate, transmit, compile, and utilize monitoring data and information in decision making.

FEM – Areas of Focus

- **Methods** – opportunities to improve the Agency's methods through policies and guidelines for method validation and peer review; flexibility in how environmental measurements are taken; method detection, quantitation, and calibration review; method formatting; and method collections.
- **Competency** – policies and programs (e.g., standards, accreditation) designed for field sampling organizations or laboratories to demonstrate their compliance to a quality system.
- **Data Management** – data exchanges between EPA's data systems, as well as the use of Staged Electronic Data Deliverables (SEDDs).
- **Monitoring** – collaborations through programs like the National Environmental Monitoring Conference, which is the largest annual conference focused on environmental measurements in North America and an internal web-tool to help connect data gaps and needs.

Environmental Laboratory Advisory Board (ELAB)

- **Purpose and Scope –**
  - Enhancing EPA's measurement programs in areas such as:
    - Validating and disseminating methods for sample collection and for biological, chemical, radiological, and toxicological analysis;
    - Developing scientifically rigorous, statistically sound, and representative measurements;
    - Employing the performance paradigm in environmental monitoring and regulatory programs;
    - Improving communications and outreach between the EPA and its stakeholder communities; and
    - Employing a quality systems approach that ensures that the data gathered and used by the Agency are of known and documented quality.

ELAB – Purpose/Scope (cont.)

- Facilitating the operation and expansion of a national environmental accreditation program. In this regard, ELAB will provide advice and recommendations to EPA on issues that impact the non-governmental community that are related to:
  - The operation and expansion of a national accreditation program characterized by an acceptance of the program by all states and suitable for accrediting environmental organizations of all sizes and types; and
  - Steps that need to be taken in order to facilitate the further implementation of the performance paradigm in the nation's environmental monitoring and environmental accreditation programs.

ELAB – Structure

- **Federal Advisory Committee Act (FACA) Board** – Operates under FACA guidelines and was formed in 1997.
- **Composition** – Approximately 15 members from communities such as:
  - Trade Associations from the Environmental Laboratory Industry or Regulated Community
  - Industry
  - Academia
  - Federal, Local, and/or Tribal Governments
  - Laboratory Assessment Bodies
  - Others

Education & Communication

Council for Regulatory Environmental Modeling | Office of the Science Advisor | US EPA

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Council for Regulatory Environmental Modeling

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- Model Evaluation
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Updates

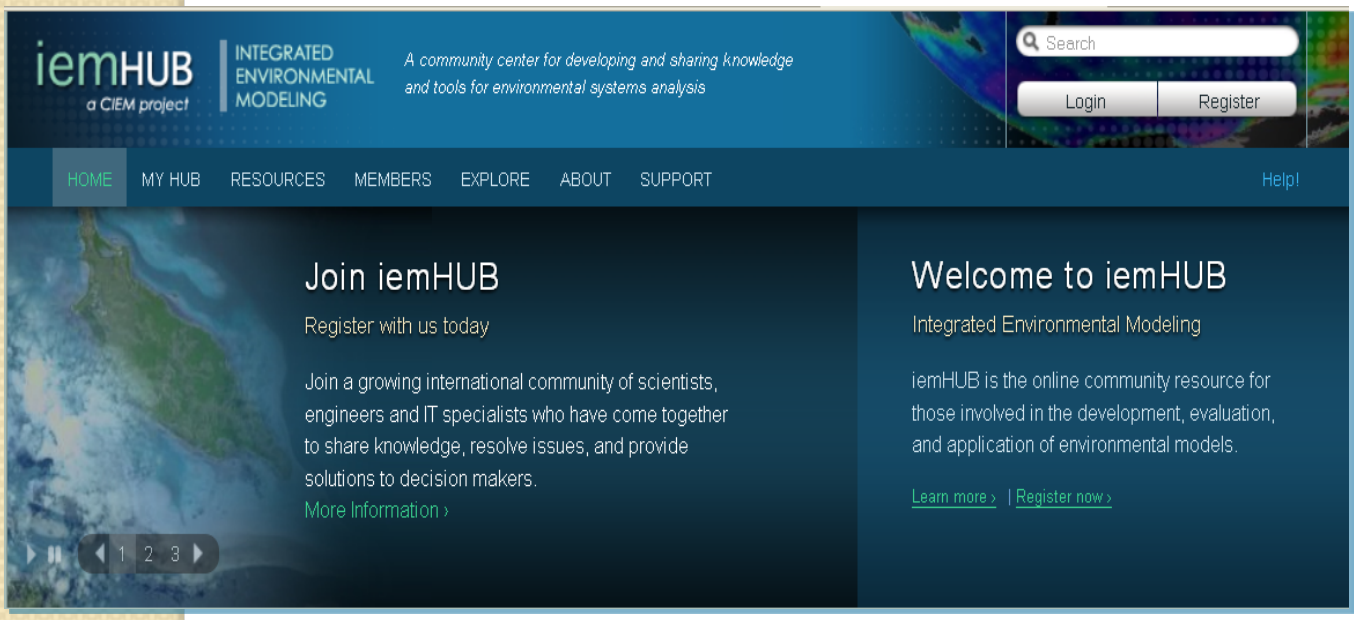
- On-line Training in Environmental Modeling
- An Overview of Exposure Assessment Models Used by the US Environmental Protection Agency

Welcome to the homepage of the Council for Regulatory Environmental Modeling (CREM). The CREM is a cross-agency group which promotes scientific integrity and defensibility in the modeling principles, practices, and guidance which inform environmental and public health regulatory decision-making and research applications. The Council works toward encouraging quality practices and principles in modeling, including higher expectations in the state-of-the art applications of modeling. It also strives toward consistency and consensus as appropriate among modeling experts, model developers, and model users within the Agency while fostering the development and application of integrated modeling both across EPA and the greater environmental modeling community. The CREM attempts to overcome traditional Agency modeling barriers resulting from environmental media-specific constraints and Agency decentralization. The Council's members consist of senior managers from across the Agency?s offices and regions. CREM charter (PDF)

Primarily, the CREM serves as a dynamic forum, actively-sought source of expertise, and central point of contact related to quality assurance, transparency, best practices, interoperability, outreach, and other emerging multi-stakeholder issues in the modeling of public health and environmental protection. The Council reaches out to Agency Program Offices and Regions, as well as the external community among decision makers, states, other executive branch organizations, and the public, to provide guidance, training, and support while efficiently and effectively leveraging public resources. As part of this mission, the CREM will, on an ongoing basis, review, update, and add to guidance on model quality assurance, as well as databases, tools, guidance, and training for Agency models, while engaging with Agency and external stakeholders in such tasks.

Integrated Environmental Modeling

Community of Practice for Integrated Environmental Modeling: providing access to a diverse range of scientists and tools across EPA, Federal Agencies, and internationally.



FEATURES:

- Model / Tool Repository
- Documents Library
- Training / Technical Support Tools
- Community Support Forum

iemHUB: *Collaboration Resource for the Environmental Modeling Community*

http://www.iemhub.org

Modeling Inventories & Activities

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Registry of EPA Applications and Databases (READ)

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Overview | Basic Information | What is a System Inventory? | Quality

SoR Home

READ Home

Frequent Questions/Help
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Link to Data Standards

Reusable Component Services (RCS)
Data Element Registry Services (DERS)
Terminology Services (TS)
Substance Registry Services (SRS)
Facility Registry Services (FRS)
Environmental Dataset Gateway (EDG)

Discovering Environmental Information Resources

The Registry of EPA Applicatio

Each information resource has
record also includes basic infor

- Title
- Acronym
- Description
- Contact information
- Organization that owns

More detailed information also
in the case of an application/sy
types, and access information

EPA@Work CREM@Work FEM@Work Login

FEM Forum on Environmental Measurements

EPA-MAC

Method and Modeling Inventory Tool

Home | Search | Browse | My Responses

EPA-MAC All Responses Search

Select a search category from the dropdown menu, or type one or more terms in the search box and then click the Search button. The EPA-MAC search function will return a list of survey responses that match your search terms. Be sure to check your spelling when conducting your search. The EPA-MAC will search for the exact combination of words that you type in the search box (e.g., 'method development', '301 Method', 'develop method', 'Method 301'). If you wish to search for several possible words, you will need to separate those words with a comma and then select the 'AND' or 'OR' button, which will determine whether the search looks for any of the words identified or all of the words identified (e.g., 'method, 301, development' with AND chosen would return only entries with all three of these words). This function is not case sensitive.

NOTE: The search and browse features are separate functions and cannot be used in tandem.

- **All key words:** Searches the entire survey for key terms within the question, response, and user/organization information.
- **Pollutants:** Limits the search of key terms to specific survey questions with pollutant-related information.
- **Decisions informed by the Model Activity:** Limits the search of key terms to a specific survey question with decision-related information.
- **Model Name:** Limits the search of key terms to specific survey questions where model names are entered.
- **Method Activity/Purpose:** Limits the search of key terms to specific survey questions with method activity or purpose information.
- **Matrix:** Limits the search of key terms to a specific survey question with matrix information.
- **Method Type:** Limits the search of key terms to specific survey questions with method type information.

All key words Search

AND OR

Uncertainty & Variability

	Policy / Guidance	Tools / Methods	Training	Case Studies
Assessment Design	-QAPP guidance R1 -EPA, 1995, 1997, provide good context for and importance of but little details. - EPA, 2002, 2006 (Quality) reference good basics on planning up front with quality limits. -IPCC, 2010. Concepts and how to approach -NRC, 2012 -QAPP guidance tends to focus on form (whether all elements covered) but lacking in content (how good th	-Matotte and Bender, 2009, review of tools – in integrated models and availability of software -Analytica, BayesNET -JCGM, 2012 -Comprehensive multi-media tool – most are currently media specific	-EPA, 1995, 1997, provide good context for and importance of but little details. - EPA, 2002, 2006 (Quality) reference good basics on planning up front with quality limits. -CREM training module #8 -ORNL Intro guide Many are media or domain specific -Comprehensive multi-media tool -EJRC website – Sensitivity Auditing (Saltelli)	STPC Problem and Scoping Lessons Learned
Problem Formulation	RIVM/MNP – Quickscan, Ch CCSP, 2009. S the importan consider RAGS3? Comprehensi guidance			
Model	-QAPP guidan assumptions - needs to im verification a -Model Valida -NRC, 2012b -RIVM Pedigr -Comprehens guidance -Model Docu form – pedigr checklist to se information			

Landscape Resource Toolbox

Key Resource Gaps - Training

Assessment Design	Resource	Target Expertise	Content	Domain				Type of Training									Needs
				R	E	FT		Po	Gu	Me	Pr	Tu	Ws	Wr	Rp	Pa	
	EPA 1995	123	Good context for and importance of U/A	•				x									Training with technical directions
	EPA 1997	23	"	•					x								As above and at the project officer level.
	EPA 2002	1	Good basics on planning quality		•				x								Training material
	EPA 2006	123	"		•				x								"
	CREM module #8	123	Good basics to overview of common methods						x								Training on how to perform the common methods of U/A

Collaboration – From Wikipedia

- Collaboration is …
  - working with each other to do a task.
  - a recursive process where two or more people or organizations work together to realize shared goals.
  - more than the intersection of common goals seen in co-operative ventures, but a deep, collective, determination to reach an identical objective.
  - an endeavor that is creative in nature – by sharing knowledge, learning, and building consensus.

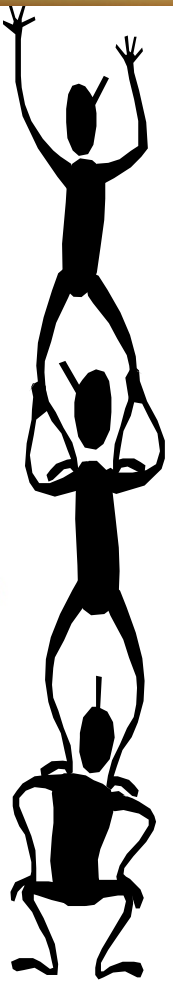
Collaboration

Alliance

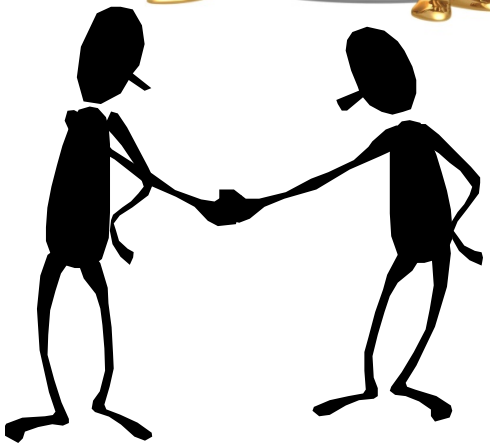
Cooperation

Association

Working Together



Participation



Joint Effort

Method Collections

Method Collections | Measurement Science | Office of the Science Advisor | US EPA

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  - Performance Approach
  - Technical Assistance
  - Method Detection/ Calibration
  - Laboratory Competency
  - National Env Accreditation
  - NEMC

Test Method Collections

This site is maintained by EPA's Forum on Environmental Measurements as a service to the environmental analytical community.

Test methods are approved procedures for measuring the presence and concentration of physical and chemical pollutants; evaluating properties, such as toxic properties, of chemical substances; or measuring the effects of substances under various conditions.

EPA Method Collections

Air and Radiation

- Source Emission Methods
- Source Continuous Emission Monitoring Performance Specifications
- Ambient Monitoring Methods
- Mobile Source Methods
- Radiation Methods

FEM Internet:
http://www.epa.gov/fem

FEM Intranet:
http://intranet.epa.gov/osa/fem

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All key words | Search

AND ○ OR ○

Flexible Measurements

- Increased emphasis on flexibility in choosing sampling and analytical approaches to meet regulatory requirements for measurements;
- Development of processes for validation that confirm that measurements meet quality requirements;
- Increased collaboration with stakeholders to develop validation processes for new measurement technology; and
- Rapid assessment of new or modified technologies, methods and procedures.

Monitoring Assessment

- **Purpose** – The Agency needed to synthesize monitoring programs to expand our scientific capabilities, information, and knowledge to meet the Agency's mission of protecting human health and the environment.
- **Produced Database** –
  - an inventory of routine monitoring programs;
  - a list of needs and data gaps; and
  - a list of collaborative and/or leveraging opportunities.
- **Indentified Common Themes** –
  - Measurement and Method Development
  - Data Management
  - Data Analysis or Assessment
  - Emergency Response

Data Gaps & Needs Inventory

EPA United States Environmental Protection Agency

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Monitoring Information, Technology & Opportunities Resources

At the direction of the Science and Technology Policy Council (STPC), the Forum on Environmental Measurements (FEM), with participation from all Agency program and regional offices and the Office of Research and Development (ORD), evaluated the Agency's monitoring programs. This assessment resulted in the creation of MonITOR to establish a sustainable mechanism for our programs to share:

- an inventory of routine monitoring programs across the Agency;
- a list of needs and data gaps; and
- a list of collaborative opportunities.

This website acts as a conduit to link EPA's information for monitoring programs with EPA monitoring data gaps and needs. This website additionally provides information to link users to various monitoring methodologies and programs throughout EPA. A key feature of the MonITOR site is the ability for users to examine potential collaborative leveraging opportunities and links between current monitoring programs and the identified monitoring needs and gaps.

Monitoring Program Inventory

The Program Monitoring Inventory provides searchable information on current monitoring programs and databases funded and/or used by EPA. (e.g. EPA Lead Monitoring Program and FDA Pesticide Residue Program)

Use Program Inventory

Data Gaps & Needs Inventory

The Monitoring Gaps & Needs enables the searchable viewing of data gaps and needs that were identified by Agency program and Regional offices and ORD. (e.g. EPA ORD request for Monitoring Air Contaminants from CAFOs)

Use DGN Inventory

MonITOR

Login

User Name:

Password:

Login

Create a Login | Reset Password

Quick Links

- Background/History
- Monitoring Program Inventory
- Data Gaps & Needs Inventory
- Collaborative Engagement
- Related Links
- Data Management Inventory & Commonalities Initiative (Coming soon)
- Method Information

Leveraging Opportunities

Collaborative Engagement

The Collaborative Engagement section provides users with information on collaborative opportunities that are being explored internal to EPA and external and an opportunity to create connections. (e.g. EPA Region Seeking to share laboratory or vessel time for marine monitoring)

Collaborative Engagements

Related Links

The Related Links section provides URL Links to Monitoring Information within and outside the Agency. (e.g. EPA On Scene Coordinator SCRIBE)

Related Links

Data Management Inventory & Commonalities Initiative

The Data Management section is only a placeholder at this time, while we explore establishing a consistent framework to move towards registering all Agency data in an Agency catalogue.

Method Information

This section redirects you to the EPA-MAC: Method and Modeling Inventory Tool. By selecting 'Method Responses' or 'Modeling' upon entering this application, you can learn more about work that is underway or completed, yet not used for regulatory purposes. (e.g. What models use, are related to or similar to EPA BASINS watershed model)

Method Information

Updated on 2/5/2013

NATIONAL ENVIRONMENTAL MONITORING CONFERENCE

NEMC

Information for Presenters

Information for Exhibitors

Information for Trainers

Important Dates

Abstracts Due	2-10-14
Deadline for Registration	7-08-14
Presentations Due	7-15-14
Papers Due	9-05-14

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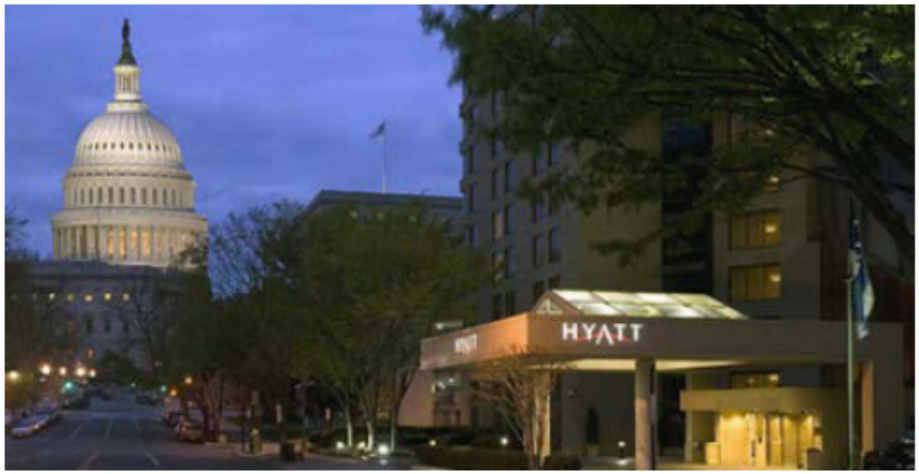
Links

Environmental Measurement Symposium

2014 NEMC
August 4-8, 2014 • Hyatt Regency • Washington, DC



Welcome

The 2014 National Environmental Monitoring Conference (NEMC), will be held at the Hyatt Regency Washington. This year, the Symposium's theme is "The Next Generation of Environmental Monitoring". Some of the highlights for the week include:

Submit Abstract for NEMC 2014

Join the NEMC Mailing List

Collaborative Engagement

EPA

www.epa.gov/research

science in ACTION

INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

EPA CAN HELP DEVELOP YOUR NEW TECHNOLOGY

EPA has many programs and resources to assist a company or individual in developing environmental technology.

The Environmental Technology Opportunities Portal
www.epa.gov/etop

This web page is your gateway to learning about programs that help fund development of new environmental technologies and offer information on existing environmental technologies.

EPA's Environmental Technology Verification (ETV) Program
www.epa.gov/etv

This web page describes the ETV program, which develops testing protocols and verifies the performance of innovative technologies that have the potential to improve protection of human health and the environment.

Small Business Innovation Research Program
www.epa.gov/ncer/sbir

This Web page provides information on EPA's Small Business Innovation research program that translates innovative ideas into commercial products to solve environmental problems.

Small Business Gateway
www.epa.gov/smallbusiness

This web page offers resources for small businesses including compliance assistance and technical help.

- Small Business Opportunities
  - http://www.epa.gov/osbp/
- Grants and Fellowship Information
  - http://www.epa.gov/epahome/grants.htm
- Partnership Programs
  - http://www.epa.gov/partners/index.htm
- Cooperative Research and Development Agreements

Extramural Research – People, Prosperity and the Planet

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- Grant Recipients: 2012/2013 P3 Teams
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You are here: EPA Home » Research » Extramural Research » P3: People, Prosperity and the Planet Student Design Competition for Sustainability » Basic Information

Basic Information

WHAT IS EPA's P3 Program? P3 stands for *People, Prosperity and the Planet*. Through this EPA program, college students can benefit people, promote prosperity and protect the planet by designing solutions that move us towards a sustainable future.

a student design competition for sustainability

WHAT AREAS OF SUSTAINABILITY ARE ELIGIBLE FOR THE P3 COMPETITION? EPA considers projects that address challenges from a wide range of categories: water, energy, agriculture, built environment, and materials and chemicals. The categories of clean cookstoves and green infrastructure were added to the 2012 solicitation. These can be challenges found in the developed or developing world.

More Information

- Basic Information
- How to Apply
- Printable Fact Sheet (PDF) (2 pp, 2.1MB)

WHAT IS THE P3 AWARD C
team contest. For the first
$15,000 grants. Recipien
projects during the acade
report and a Phase II prop

Intel® International Science and Engineering Fair® 2013

The Intel® International Science and Engineering Fair® EXIT Disclaimer (Intel ISEF), is the world's largest international pre-college science competition. It is the premier global science competition for students in grades 9-12. Each year more than 1,500 high school students from over 70 countries, regions, and territories display their independent research and compete for more than $3 million in awards. It was held this year in Phoenix, AZ.

Since 2009, EPA has exhibited and shared information about environmental protection with the ISEF participants and visitors. EPA encourages the young innovators to apply science to environmental challenges and recognizes one student whose work demonstrates a commitment to environmental sustainability and stewardship with the EPA Patrick H. Hurd Sustainability Award.

In 2011, the Sustainability Award was renamed in honor of Patrick Hurd, who managed the effort behind the first EPA Sustainability Award. Read his Science Wednesday blog post Science is Cool.

Collaborative Engagement

(cont.)

Modeling Perspective

- **Budget and resource constraints** require better alignment and coordination of our capabilities and elimination of redundancies.
- Environmental and human health problems are rarely media specific. An **integrated, holistic, and systems thinking** approach is needed to inform effective sustainable policies and management decisions.
- A **suite of scientific tools** are often used to inform decision making, like monitoring data, modeling, and geospatial analyses.

Summary

- The issues we face are more complex and subtle than in the past; so, the need for the best science is greater than ever now.

- There is a need to use more modeling techniques and monitoring/ measurement data through tools, such as integrated modeling and geospatial analysis, to address these complex problems.

- Collaboration with partners within and outside of the Agency provides leveraging opportunities for greater success in cleaning-up our world's environment.

Contact Us

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- Environmental Laboratory Advisory Board
  - http://www.epa.gov/elab