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**Meet EEE Alumni: Shelley Koehn, Advanced Environmental Engineer with 3M**

- Monday September 16th 12:30-1:30pm POTR 234 (Fu Room)
- EEE alumni talks about her experiences after graduation, focusing on 3M and their environmentally related job opportunities.
- Pizza will be provided

**Pizza Party with EEE External Advisory Council ** *

- The EEE External Advisory Council (EAC) includes members from environmental consulting firms, major industry, government, and academia. The EAC works closely with the EEE Head to advise on all aspects of the program and strategic growth as EEE launches new programs. The EAC meets on campus twice a year and in a conference call twice a year. See who is on the EAC at https://engineering.purdue.edu/EEE/People/EAC.
- PIZZA PARTY (see attached flyer)
  Sept. 26 at 6 PM
  Puccini's Smiling Teeth Pizza & Pasta, 300 Brown St, West Lafayette
- First 40 students that respond to eee@purdue.edu will attend!

**Job Corner with Ms. Whelton, PE**

What a busy week with the Industrial Roundtable Career Fair. Hopefully you all got a chance to speak with companies there. There is one other big event for environmental positions in the fall—the CE Career Fair. There are 40 companies that have environmental listed when I checked today! The companies at this career fair are mainly consulting focused. They are also having info sessions this year and distributing a career fair booklet prior to the event. More details are given below.

- **CE Career Fair**
  Thursday Oct 10th
  9:30 AM - 2:30 PM
  Purdue Memorial Union North and South Ballrooms

Career fair info: https://engineering.purdue.edu/CESAC/careerfair/studentinfo

A list of all companies attending (look for those that have “environmental” listed in the “area of emphasis”): https://purdue-csm.symplicity.com/events/index.php?id=9a4f8463aff9970b2def912f60288066

You can register for the fair ahead of time and give your resume to your top ten employers prior to the career fair.

- **CE Career Fair Informational Sessions**
  Wednesday Oct 9th
  5:30-8:30pm @ HAMP
  The info session schedule is not yet posted.

The College of Agriculture Fall Career Fair is another career fair you may want to attend. There may be more opportunities with agricultural companies and on the ecological side of things.

- **College of Agriculture Fall 2017 Career Fair**
  Tuesday October 1st
  9:30am-3:30pm
  Cordova Recreational Sports Center

Look for those companies interested in “Natural Sciences and Environmental Studies” and also ABE.
More information: https://purdue-csm.symplicity.com/events/a08f88a27ea1e2917a80c298b046ea2e/overview
See who's attending (search for emphasized given above): https://purdue-csm.symplicity.com/events/a08f88a27ea1e2917a80c298b046ea2e/employers
Checklist for the career fair: https://ag.purdue.edu/oap/career/Documents/CAREER%20FAIR%20CHECK%20LIST.pdf
Through the link above, you can allow 10 companies to preview your resume prior to the career fair!

Don't forget to research the companies you are interested in prior to the career fair.

The CCO also has a great new feature to help you with the interview process. You can now practice interviewing from your home! They will even help you develop answers to common interview questions. Check out Big Interview to help you get prepared: https://purdue.biginterview.com/

**Dates to Know**

- September 16, Last Day to Withdraw a Course with a Grade of W or to Add/Modify a Course with just Instructor and Advisor Approval
- October 7, Schedule of Classes published for Spring 2020 Term
- October 7-8, October Break (No Classes)
- November 27-30, Thanksgiving Vacation (No Classes)
- December 7, Classes End
- December 8, Schedule of Classes published for Summer 2020 Term
- December 9-14, Final Exams
- December 15, Fall Commencement
- January 13, Spring Semester Classes Begin

See the full 2019-2020 academic calendar

**Purdue Span Plan**

- Span Plan Nontraditional Student Services offers an array of support services for nontraditional undergraduate students at Purdue University. Do you meet Span Plan eligibility? Do you meet at least one of the following criteria:
  - 2-year delayed enrollment into post-secondary education
  - Financially independent for financial aid purposes
  - Has dependents other than a spouse or domestic partner
  - Married student/in a domestic partnership
  - Transfer student age 23 or older when beginning at Purdue University
- If any of these apply to you, see attachment for information on student services available to you.

**Udall Scholarship**

- The Morris K. Udall and Stewart L. Udall Foundation annually awards approximately 50 scholarships of up to $5,000 each to sophomore and junior students who have demonstrated commitment to careers related to the environment, including policy, engineering, science, education, urban planning and renewal, business, health, justice, economics, and other related fields. At Purdue, nominations for the Udall are coordinated by the National and International Scholarships Office (NISO).
- NISO is available to serve all Purdue students, and they assist students and alumni who have excellent academic records in their scholarly development to apply for any of the 13 highly selective national and international awards that require a nomination by Purdue. To explore opportunities further visit the NISO website at http://www.purdue.edu/niso, go to HCRS 1056 or call 496-3389 to schedule an appointment.
- Requirements:
  - Full-time matriculated sophomore or junior pursuing a degree at a university during the application year
  - GPA of at least "B" (3.0)
  - U.S. citizen, U.S. national, or permanent resident
  - Only Native Americans and Alaska Natives are eligible to apply in tribal public policy or Native American health care; however, students applying in environment do not need to be Native American or Alaska Native to apply.
Greater Lafayette Start Up Weekend

- Do you have an idea you’d like to pursue or a problem you’d like to solve but don’t know where to start or who to start with? Startup Weekend is the place to look for a team, create a prototype of your idea, validate your business idea, and receive feedback from experienced entrepreneurs, all in one weekend.
- September 13-15th
- Techstars Startup Weekend is a full weekend long experience. Your ticket includes:
  - 7 full (and delicious) meals over the course of the weekend
  - Benefits and discounts from our global partners
  - One-on-one time with amazing mentors
  - A new network of developers, designers, and entrepreneurs eager, like you, to change the world.
  - All the internet and coffee you can consume
- Contact lafayette@startupweekend.org with questions
- Register here: https://www.eventbrite.com/e/greater-lafayette-startup-weekend-tickets-59732370127

Ecological Sciences and Engineering Symposium *

- Join ESE for engaging discussion of the trade-offs and synergies between the Sustainable Development Goals on October 17-18th. Symposium events include:
  - Video competition
  - Disaster simulation
  - Expert panel
  - Keynote speaker
- Full agenda here: https://www.purdue.edu/gradschool/ese/symposium/2019/agenda.html
- Video competition details:
  - Submit a short video (3 minutes or less) regarding the United Nations Sustainable Development Goals (SDGs) aimed at protecting our planet while reducing inequalities. Videos should focus on the implementation of a specific SDG, overall successes and challenges in achieving SDGs, and/or highlight the complex interconnectedness of the goals. There should be no more than three people per video submission. Videos longer than 3 minutes will not be accepted.
  - First place - $500, second place - $300, third place - $100, popular vote (chosen at the symposium) - $50
  - Submission link: https://docs.google.com/forms/d/1TWbr7HedLhX7gxDC-qWWmfoL91nuLCm6aZFOC5svWo/viewform?edit_requested=true&ga=2.76930582.285014570.1568212275-611826861.1568212275
  - Submission deadline: October 11th

Krannert Case Challenge *

- Similar to real-world business projects, Stamina4 Case Competitions are intensive, experiential learning opportunities that allow students to showcase their critical thinking and analytical abilities, communicate their ideas, and demonstrate mental tenacity. Stamina4 participants only have four hours to analyze a case and create a presentation to share their recommendations
- Requirements:
  - Teams must be exactly 4 members
  - Open to all Purdue Full-time Undergraduate and Master’s Students. Teams MUST include a minimum of one Krannert student
  - Winning teams MUST be available to compete in the Purdue/IU Case Competition which will be held on November 14 and 15 on the IU campus
- To register and for more information go here: https://webapps.krannert.purdue.edu/Pitch/Faq

Purdue Online MBA

- The Krannert School of Management is excited to announce the availability of the 100% online Purdue MBA beginning in January 2020. Developed and taught by the same celebrated faculty as our campus program, the online MBA will help working professionals develop leadership and management skills in business and technology. Designed to be flexible and student-centric, the program will allow Purdue Alumni from anywhere in the world to access the education they need to move their careers forward.
Design Competition for Addressing Airport Needs *

- The Airport Cooperative Research Program (ACRP) is sponsoring a national competition for universities that engages students in addressing issues relating to airports and the National Airspace System. This Competition challenges individuals and teams of undergraduate and/or graduate students working with faculty advisors to consider innovative approaches related to these challenges.
- Submitters should design innovative solutions that focus on addressing airport issues and constraints that would enhance the management, safety, capacity and efficiency of the nation’s airports.
- Subject areas include:
  - Airport operation and maintenance
  - Runway safety/runway incursions/runway excursions
  - Airport environmental interactions
  - Airport management and planning
- Requirements:
  - The ACRP University Design Competition for Addressing Airport Needs is open to teams or individuals from accredited U.S. colleges and universities who are working with a faculty advisor
  - The Competition will be open for student participation from August 2019 through April 29, 2020, allowing participation during fall semester 2019 and/or spring semester 2020. Final due date for all submittals is April 29, 2020. All submissions will be judged after the due date
  - A key criterion for submittal evaluation is innovation. As part of the required literature review, participants should carefully review and consider previous, related research and proposed problem solutions in formulating and supporting their submission
- A detailed description of requirements, subject areas, competition timeline, and submission guidelines is included in the attachment.

Terraton Challenge *

- An initiative from Indigo Agriculture to engage students to come up with innovative ideas to sequester carbon from the atmosphere into agricultural soils
- For its inaugural year, the Terraton Challenge will focus on three critical areas: technologies that accelerate soil carbon sequestration, methods to quantify soil carbon, and innovative financial offerings that reward growers for capturing and maintaining soil carbon
- Up to $3.5k is available for submitting an idea
- Link to apply: https://www.indigoag.com/the-terraton-challenge
- Application deadline: October 1st, 2019
PIZZA PARTY
COME & HAVE
PIZZA WITH THE
EEE EXTERNAL
ADVISORY COUNCIL
SEPT. 26 AT 6 PM
Puccini’s Smiling Teeth Pizza & Pasta,
300 Brown St, West Lafayette, IN 47906
First 40 that respond to
eee@purdue.edu will attend!

GREAT NETWORKING OPPORTUNITY!
Fall 2019 Sept – Oct Program Dates
Visit [https://www.purdue.edu/spanplan/events-programs/](https://www.purdue.edu/spanplan/events-programs/) to RSVP!

### Academic Toolbox Sessions
- **Wednesday Sept 4th | 2:30 – 3:20 PM**
  Smart Studying: Unlocking Content Mastery, Presented by the Academic Success Center
  *Wiley Hall C215*

### The Rally
- **Saturday Oct 5th | 2:00 PM**
  Exploration Acres (family friendly)
  *6042 Newcastle Rd Lafayette, IN 47905*

### The Lunchbox Sessions
- ***** Pending ***
- **Thursday Oct 3rd | 11:30 AM – 1:00 PM**
  Undergraduate Student Parent Rights Discussion
  Presented by the Office of Institutional Equity
  *Purdue CoRec, Large Conference Room*

### Span Plan Popup
- **Wednesday Sept 11th | 6:00 – 8:00 PM**
  Rainbow Campus Callout,
  *PMU North and South Ballrooms*
- **Thursday Sept 26th | 12:00 – 2:00 PM**
  *Krannert East Drawing Room*

### Resource Readiness Studio
- **Thursday Oct 10th | 12:30 – 1:30 PM**
  Think Summer and FAFSA Completion
  *HIKS G959*
- **Wednesday Oct 16th | 9:30 – 10:30 PM**
  Think Summer and FAFSA Completion
  *HIKS G959*
- **Wednesday Oct 23rd | 3:30 – 4:20 PM**
  Scholarship Essay Writing
  *HIKS G959*
- **Thursday Oct 24th | 12:30 – 1:20 PM**
  *Scholarship Essay Writing
  *HIKS G959*
SUSTAINABLE DEVELOPMENT GOALS: ARE WE CHASING UNICORNS?

// VIDEO COMPETITION
// DISASTER SIMULATION
// EXPERT PANEL
// KEYNOTE SPEAKER

SCAN HERE FOR MORE INFO
IDEAS FESTIVAL

STAMINA4 Case Challenge in IT/Analytics

Awards Totaling $10,000!

Communication | Teamwork | Problem Solving | Professionalism

Open to all Full-Time Undergraduate and Master’s Students. Teams must include a minimum of 1 Krannert student and consist of 4 members.

The Top 4 Teams will move on to represent Purdue University in the Purdue/IU Case Challenge that will be held on November 15 at Indiana University.

REGISTRATION IS NOW OPEN

To register your team of four visit:

For further information contact Kami Copas-Barrett at kcopas@purdue.edu

Community Meeting
September 13, 6 p.m.
WALC 1132

Case Analysis and Dinner
September 17, 6-11 p.m. Krannert Drawing Room

Top 24 Team Presentations
September 26, 10 a.m.-6:00 p.m.
Stewart Center

TOP 6 Team Presentations
September 27, 10 a.m.- Noon
Purdue Honors College
Airport Cooperative Research Program
University Design Competition for Addressing Airport Needs

2019 - 2020 Design Competition Guidelines
Introduction

The Airport Cooperative Research Program (ACRP) is sponsoring a national competition for universities that engages students in addressing issues relating to airports and the National Airspace System. This Competition challenges individuals and teams of undergraduate and/or graduate students working with faculty advisors to consider innovative approaches related to these challenges.

Submitters should design innovative solutions that focus on addressing airport issues and constraints that would enhance the management, safety, capacity and efficiency of the nation’s airports.

Subject Areas

The Competition focuses on design solutions addressing airport needs in the following broad areas:

• **Airport Operation and Maintenance**

• **Runway Safety/Runway Incursions/Runway Excursions**

• **Airport Environmental Interactions**

• **Airport Management and Planning**

Background and some specific challenge areas are defined in the Technical Design Challenges section.

Students are not limited to the suggested topic areas and are free to consider design solutions in related topic areas as long as they are consistent with the four broad challenge areas.

As part of the required literature review, participants are encouraged to explore past ACRP research reports to see what ideas have already been presented and studied.

The competition website is the participant’s source for complete and up-to-date information.

First Things To Do

Go to [www.nap.edu/author/ACRP/transportation-research-board/airport-cooperative-research-program](www.nap.edu/author/ACRP/transportation-research-board/airport-cooperative-research-program) to learn about the latest studies on topics of interest to the Airport Cooperative Research Program (ACRP).

Previous studies relevant to your chosen topic will be an important start to your literature review. By getting the latest information, you can gain a foundation for exploring possible topics and building innovation into your design.

Important and useful short tutorials on doing the required Safety Risk Assessment and Cost/Benefit Analysis for your design proposal are available on the Competition website.

Know that the website has excellent connections to expert advisors you can contact. **Note that you are required to have interactions with industry advisors.**

The Competition also requires interaction with an airport operator. The Virginia Space Grant Consortium staff is able to help you link with airport operators. Email acrp@odu.edu with your request.

The ACRP Design Competition website: [vsgc.odu.edu/ACRPDesignCompetition](vsgc.odu.edu/ACRPDesignCompetition) contains:

- Competition Guidelines
- Links to ACRP and Federal Aviation Administration (FAA) Reports and Resources
- Online Design Submission Process
- Expert Advisors in Challenge Topics
- Online Notice of Intent Electronic Submission Form
- Link to Winning Designs from the 2007-2019 Competition Years
- Contact Information for Queries
- Instructional videos on the required Safety Risk Assessment and Cost/Benefit Analyses

Competition updates will be posted on the website.
Competition Goals

1. Raise awareness of the benefits of the ACRP and the importance of airports and the FAA to the National Airspace System infrastructure.

2. Increase the involvement of the academic community in the ACRP and addressing airport operations and infrastructure issues and needs.

3. Engage students at U.S. colleges and universities in the conceptualization of applications, systems and equipment capable of addressing related challenges in a robust, reliable and comprehensive manner.

4. Encourage undergraduate and graduate students at U.S. colleges and universities to contribute innovative ideas and solutions to issues facing airports and the National Airspace System.

5. Provide a framework and incentives for quality educational experiences for university students.

6. Develop an awareness of and interest in airports and aviation as vital and challenging areas for careers in engineering and technology.

About the ACRP

The Airport Cooperative Research Program (ACRP), one of the several cooperative research programs sponsored by the Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine (NASEM), carries out applied research on problems that are shared by airport operating agencies and not adequately addressed by other federal research programs. The ACRP undertakes research and other technical activities in a variety of airport subject areas involving administration, environment, legal, policy, planning, safety, human resources, design, construction, maintenance, and operations at airports. ACRP is able to draw on its targeted research to help U.S. university students be engaged in contributing innovative approaches to issues facing our nation’s airports and the National Airspace System.

Airports are vital national resources. They serve key roles in the transportation of people and goods and in regional, national, and international commerce. They are where the nation’s aviation system connects with other modes of transportation and where federal responsibility for managing and regulating air traffic operations intersects with the role of state and local governments that own and operate most airports. Research continues to be necessary to solve common operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the airport industry.

The ACRP was authorized in December 2003 as part of the Vision 100 - Century of Aviation Congressional Reauthorization Act.

In October 2005, the FAA executed a contract with the National Academies of Sciences, Engineering, and Medicine, acting through its Transportation Research Board (TRB), to serve as manager of the ACRP.

The primary participants in the ACRP are (a) the ACRP Oversight Committee (AOC), an independent governing board appointed by the Secretary of the U.S. Department of Transportation, with representation from airport operating agencies, other stakeholders, and relevant airport associations such as the Airports Council International -North America (ACI-NA), the American Association of Airport Executives (AAAE), the National Association of State Aviation Officials (NASAO), Airports Consultants Council (ACC) and the Airlines for America (A4A) as vital links to the airport community; (b) the TRB as program manager and secretariat for the governing board; and (c) the FAA as program sponsor. The ACRP benefits from the cooperation and participation of airport professionals, state and local government officials, equipment and service suppliers, other airport users, and research organizations. Each of these participants has different interests and responsibilities, and each is an integral part of this cooperative research effort.

About the FAA

The FAA is part of the Department of Transportation and is responsible for the safety of civil aviation. The activities of the FAA include:

• Regulating civil aviation, including commercial service airports, to promote safety;
• Encouraging and developing civil aeronautics, including new aviation technology;
• Developing and operating a system of air traffic control and navigation for both civil and military aircraft;
• Researching and developing the National Airspace System and civil aeronautics;
• Developing and carrying out programs to reduce aircraft noise and other environmental effects of civil aviation; and
• Regulating U.S. commercial space transportation.

The FAA provides the framework for a safe, secure, and efficient aviation system. As a leading authority in the international aviation community, the agency is responsive to the dynamic nature of customer needs, economic conditions, and environmental concerns. The FAA encourages and supports innovative research to improve airport and aviation safety, improve aviation capacity, and reduce environmental impact.

The FAA provides funds to the ACRP to support this Competition.
Competition Partners

The ACRP gratefully acknowledges the contributions of the following partnering organizations that supply expert advisors for teams, assist in dissemination of the Competition opportunity to organizational members, and participate in design reviews.

The American Association of Airport Executives (AAAE)

AAAE is the largest professional organization for airport executives in the world, representing thousands of airport management personnel at public use airports nationwide. The organization’s primary goal is to assist airport executives in fulfilling its responsibilities to the airports and communities they serve.

The Airport Consultants Council (ACC)

ACC is an international trade association representing more than 240 companies that provide development and operations-related consulting and product services to airports and other aviation system stakeholders. Members offer architectural, engineering, planning, security, environmental, financial, management, economic and construction services, products and equipment.

The Airports Council International - North America (ACI-NA)

ACI-NA is a membership organization representing approximately 160 state, regional, and local governing bodies that own and operate the principal airports served by scheduled air carriers in the United States and Canada. ACI-NA member airports handle about 95 percent of the domestic and virtually all of the international air passenger traffic and cargo traffic in North America.

The National Association of State Aviation Officials (NASAO)

NASAO was founded to ensure uniformity of safety measures, to standardize airport regulations and develop a truly national air transportation system responsive to local, state, and regional needs. The organization represents the men and women in state government aviation agencies who serve the public interest in all 50 states, Guam, and Puerto Rico.

University Aviation Association (UAA)

UAA is the voice of collegiate aviation education to its members, the industry, government and the general public. Through the collective expertise of its members, this nonprofit organization plays a pivotal role in the advancement of degree-granting aviation programs that represent all segments of the aviation industry.

The Competition is managed for the ACRP by the Virginia Space Grant Consortium based in Hampton, Va. (vsgc.odu.edu).

Overall Requirements

The ACRP University Design Competition for Addressing Airport Needs is open to teams or individuals from accredited U.S. colleges and universities who are working with a faculty advisor.

The Competition will be open for student participation from August 2019 through April 29, 2020, allowing participation during fall semester 2019 and/or spring semester 2020. Final due date for all submittals is April 29, 2020. All submissions will be judged after the due date.

Challenges might typically be addressed as part of a senior design class or independent study option or through other academic venues, including faculty-mentored, college-based student chapters of professional societies.

The Competition requires evidence of interaction with both airport operators and industry experts for feedback on the practicality of the proposed design/approach. Links to expert advisors are provided on the Competition website. The American Association of Airport Executives is offering assistance in linking students to airport operators. Participants should contact the Virginia Space Grant Consortium at acrp@odu.edu to request assistance.

A key criterion for submittal evaluation is innovation. As part of the required literature review, participants should carefully review and consider previous, related research and proposed problem solutions in formulating and supporting their submission.

The ACRP offers a wealth of research papers and other documents that students should consider in planning their submittal and proposed research approach. Links to previous and current ACRP research are available on the ACRP web site: www.nap.edu/author/ACRP/transportation-research-board/airport-cooperative-research-program. Students should also review previous winning submissions of the University Design Competition for Addressing Airport Needs and its predecessor, the FAA Design Competition for Universities. Links to these resources are provided on the Competition website.

Participants are encouraged to take an interdisciplinary approach to the selected topic and a cross-departmental approach where appropriate. Submissions must be student written and demonstrate a thorough understanding of current conditions/state-of-the-art approaches relevant to the chosen topic. Guidelines for elements of the submittal package are provided on page 11.
Technical Design Challenges

I. Airport Operation and Maintenance

The day-to-day operation and maintenance of an airport involves many tasks. Airport operators must handle both routine matters and unusual circumstances. Their responsibilities include keeping records; hiring and training personnel; maintaining pavement; maintaining markings, signs, and lighting; providing snow and ice control, if applicable; managing emergency preparedness; overseeing handling of hazardous materials, including jet fuel; conducting airport self-inspections; overseeing procedures for operation of vehicles on the airfield; providing obstruction lighting; protecting navigational aids; protecting public safety; dealing with wildlife control; and overseeing construction projects.

Almost 20,000 airports are located throughout the United States today. Of those, approximately 8,700 feature paved runways, taxiways and ramps/aprons. Paved airport surfaces can be affected by many things: adverse weather, build-up of rubber residue from aircraft tires, and normal wear and tear. The pavement surface must also be kept free of what is referred to as foreign debris.
This debris can be in the form of such things as rocks and stones tracked onto the pavement surfaces from grass areas adjacent to the pavement, material coming off aircraft during taxiing, landing, or takeoff, and objects blown from the aircraft servicing areas. This debris can cause major damage to aircraft engines if it is ingested or affect the aerodynamics of a propeller.

Airport operators certificated under 14 Code of Federal Regulations Part 139 are required to keep these surfaces in a condition that meets requirements specified in the regulation. These surfaces are inspected visually on a regular basis so any deficiencies can be found and corrected. Some automated systems have been developed to supplement aspects of these visual inspections.

In the interest of safety, airport runways and taxiways and other operational surfaces must be closed for pavement repairs, causing significant operational problems. Runway closures reduce capacity at that airport, affecting carriers that may have to juggle flights to accommodate the repair and inconveniencing non-airline (called general aviation, or simply GA) aircraft that need to use alternate airfields, especially if the closure is unplanned. Any technologies or procedures that improve the structure/longevity of pavement, increase the speed of repairing pavement, or automatically alert the airport operator to hazardous pavement conditions will be a welcome advance for airports.

This Design category has challenges that focus on new approaches that will help airport operators increase airfield efficiency outside of the terminal and airport buildings. Terminal facilities, exclusive of security, can also be a subject of interest.

Designs can also consider the potential effects of NextGen on airport operations.

Airport Operation and Maintenance Challenges:

A. Exploring new methods for design and maintenance of pavement surfaces. Ideas include, but are not limited to:
   - Methods for innovative pavement repair.
   - Innovative pavement materials, installation and maintenance techniques, including nondestructive evaluation methodologies.
   - Improved approaches to rubber removal/surface restoration resulting from aircraft tire residue.
   - New or improved techniques for ice removal from runways.

B. Improved methods for foreign object detection and removal from runway surfaces.

C. Innovative approaches to address wildlife issues at airports including bird strikes.

D. Improved tug systems for aircraft including alternative power modes.

E. Innovative applications, including web-based solutions, for airport operations and maintenance.

F. Improved methods for ground traffic flow scheduling.

G. Innovative ways to collect, verify, distribute or use geospatial data to benefit safety or efficiency impacting airport operations. Note: The FAA Office of Airports has developed an Airports GIS program to collect authoritative
The FAA aims to reduce the severity, number, and rate of runway incursions by implementing a combination of technology, infrastructure, procedural and training interventions to decrease the prevalence of human errors and increase the error tolerance of airport surface movement operations.

The FAA is developing airport design concepts and surface movement procedures, such as the use of perimeter taxiways, to decrease the number of runway crossings and thereby reduce the risk of runway incursions. Related efforts address the errors committed by pilots, air traffic controllers, and airport-authorized vehicle operators and pedestrians.

Also of great concern are runway excursions. A runway excursion occurs when an aircraft departs the runway in use during the take-off or landing run or during taxiing. The excursion may be intentional or unintentional. Runway excursions are mainly of three types—overrun, undershoot and veer-off. Examples of runway excursions include: (1) a landing aircraft is unable to stop before the end of the designated runway is reached leading to a overrun; (2) an aircraft taking off or rejecting takeoff or landing departs the side of the designated runway leading to a veer-off; (3) an aircraft attempting a landing touches down in the undershoot area of the designated landing runway within the aerodrome perimeter; or (4) a runway or taxiway other than the designated one is used for a takeoff or a landing.

Runway excursions are the most frequent accident category worldwide. Between 2009 and 2013, there were 432 total commercial aviation accidents. Of these, 98 were runway/taxi excursions of which 7 involved a total of 191 passenger and crew fatalities (Source IATA). Studies of runway excursions have called for appropriate measures to be taken to address this problem.

Runway Safety/Runway Incursions/Runway Excursions Challenges:

A. Methods for improving runway safety during airport construction and reconstruction.

B. Optimizing safety through improvements to and redesign of existing runways and taxi ways.

C. Safety considerations for drones operating in or near the airport environment—issues and constraints as well as benefits and costs.

D. Innovative concepts for virtual/remote towers at non-towered airports.

E. Optimizing application of NextGen technology to improve runway safety in particular and airport safety in general.
F. Expanding situational awareness of pilots and ground operators on the airfield. Ideas include, but are not limited to:

- Mobile tools for pilots, pedestrians and vehicle operators that aid in situational awareness.
- Direct warning systems to alert pilots that they are approaching a runway and if the runway is occupied.
- Direct warning systems to alert air traffic controllers for situations leading to runway incursion.
- Direct warning systems to alert airfield drivers that they are approaching a runway they are not authorized to cross.
- Development of innovative techniques to record, analyze and display annotated spatial data for improved situational awareness of ground operations.
- Methods for aircraft/runway interface that address issues caused by new energy efficient lighting not being visible to heat sensing, enhanced flight vision systems.

G. Enhancing airport visual aids

- Improved lighting, marking, and signage for runways, taxiways and the airport apron.
- Lighting other than traditional incandescent.
- Providing surface navigation guidance to pilots in the cockpit via electronic alternatives in limited visibility conditions (in lieu of outside visual cues).

H. Runway excursions

- Identification of major causal/contributory/contextual factors leading to runway excursions.
- Risk analysis of runway excursions due to overrun/undershoot/veer-offs.
- Innovative approaches to reducing runway excursions and associated risks.

I. Safety assessment tools

- Mobile tools to support assessments conducted by runway safety action teams that aid in compliance evaluation as well as hazard identification and correction.
- Systems analysis to determine areas of greatest risk for runway incursions and excursions in the National Airspace and proposing corrective action plans.
- Innovative processes to identify the hazards that present the greatest risk to air carrier operations within the runway environment and strategies to mitigate those hazards and improve safety of airport surface operations.

While students will need to undertake a thorough literature search, some key documents and resource links to begin the process are listed on the Competition website.

III. Airport Environmental Interactions

As the FAA carries out its mission, it must comply with regulations protecting the environment. All airport operations must be carried out with consideration for how the environment could be adversely affected. Airport environmental concerns may include many things: noise; land use; social impacts; air quality; endangered and threatened species; energy supply and natural resources; light emissions; solid waste impacts; or construction impacts.

[vsgc.odu.edu/ACRPDesignCompetition](vsgc.odu.edu/ACRPDesignCompetition)
For the purpose of this Competition, the ACRP has chosen to focus on: making snow and ice removal more environmentally friendly, improved methods for containment and cleanup of fuel spills, storm water management, noise reduction, air quality around airports, and energy efficiency.

As mentioned in Section I, Airport Operation and Maintenance, one of the airport operator responsibilities is snow and ice control on paved surfaces. Air carriers/pilots must ensure their aircraft are free of ice/snow to enable a safe takeoff. In many cases, this involves application of a chemical agent, which for both aircraft and airport pavements must meet strict corrosivity requirements. After the aircraft is treated, the airport operator is left with the problem of how to dispose of these chemicals or other cleanup required. Any improvements in aircraft and/or pavement anti-icing and/or de-icing agents themselves, new methodologies or procedural improvement would be welcome.

Another environmental hazard is fuel spills. While a hazard on the airfield itself, airport operators must also ensure the spilled fuel does not enter the water supply where it can do even more damage. Storm water management at airports is important to prevent contaminants such as chemicals and fuels from entering the water table. Air quality around airports is also a factor.

Energy efficiency is another factor of environmental responsibility at airports. Energy is required for all airfield buildings, vehicles, and the airfield itself. It can be a challenge, especially at remote airports that may not have an independent power source, to keep the airfield properly lit.

This Design category has challenges that focus on improvements in snow and ice removal, containment and cleanup of fuel spills, storm water management, noise reduction and energy efficiency that will help airports carry out their mission in a way that will be environmentally sound and energy efficient.

**Airport Environmental Interactions Challenges:**

A. Making snow and ice removal more environmentally friendly. Both chemical and nonchemical options can be considered. The ACRP is seeking designs that offer:

- Improved means and methods of complying with aircraft and airfield anti- and de-icing requirements.
- Environmentally safe aircraft and airfield anti- and de-icing products that are compatible with both aircraft structures and airport pavements.
- Improved containment and cleanup of anti- and de-icing products.

B. Improving methods for containment and cleanup of fuel spills.

- Bioremediation techniques for fuel spill cleanup.
- Techniques/substances for neutralization of toxic components of fuel.
- Techniques/substances that delay the biological and chemical breakdown of fuel, allowing cleanup to occur without causing rapid decreases in dissolved oxygen in receiving waters that result from biological and chemical degrading of the fuel.
- Techniques for prevention of percolation of fuel into groundwater.

C. Increasing energy efficiency in the management of airfields, the terminal area and other airport buildings. Topics that might be considered include:

- Alternative energy/energy efficient airport equipment such as tow vehicles, emergency generators, power units, heating systems, etc. for use in airfield areas.
- Alternate energy sources and approaches to providing lighting at remote airports that don’t have access to electrical power.
- Innovative approaches to solid waste reduction at airports.
- Integration of alternative energy-producing and energy-saving technology into the airport environment.

D. New tools and approaches to storm water management methods, water use at airports, and dealing with negative impacts of standing water.

E. New tools and approaches to help reduce noise at airports.

F. System level methods for strategic assessment of environmental interactions beginning at the airport planning phase.

G. Enhanced methods for improving air quality around airports.

H. Innovative strategies for management of natural environments to minimize negative impacts on, and to enhance compatibility with, Airport Operations.

I. Enhancing potential for resilience and sustainability of airport improvement projects in response to climate change effects or other naturally occurring catastrophic events such as hurricanes and other extreme weather events, sea level rise and changing weather patterns.

While students will need to undertake a thorough literature search, some key documents and resource links to begin the process are listed on the Competition website.

vsgc.odu.edu/ACRPDesignCompetition
IV. Airport Management and Planning

In today’s airport environment, especially at the busier airports, any change in “normal” operations affects that particular airport and also may ripple across the NAS and affect many other airports and passengers. To meet this challenge, the FAA, airport operators, and airport users must work together to develop action plans that provide the best solutions for local and regional areas, as well as the nation. An integrated approach is preferred which includes improving technology, air traffic control procedures, and expanding airport and airfield infrastructure.

Airport Management and Planning Challenges:

This Design Category has challenges that focus on airfield management and planning that will help airport operators optimize the use of existing airport resources and plan for upcoming functional needs.

A. Maximizing airport capability
   • Strategies for accommodating aircraft that experience extended delays on the tarmac and in line for takeoff, including dealing with human needs as well as airport and airline capabilities.
   • Innovative approaches to demand forecasting and management for airports.
   • Innovative strategies for reducing airline fuel consumption during ground operations, such as new ways to reduce gate-to-gate time or improve other aircraft loading/off-loading procedures.
   • Effective alternatives to current ramp and gate controls.
   • Creative approaches to airport revenue generation for general aviation airports.
   • Models for collaborative decision making and data sharing at airports.
   • Improved aircraft and airport design factors affecting aircraft compatibility to decrease the risk of aircraft wing tip collisions in the non-movement apron areas.
   • Improved strategies for airport asset management, including land use.
   • Innovations to accommodate the aging passenger demographic at airports.
   • Effective uses of social media in airport planning, marketing, development and customer service.
   • Planning for the integration and mitigation of possible impacts of drones into the airport environment.
   • Enhanced management approaches to landside functions to include parking and ground transportation.
   • Innovative approaches to building and maintaining workforce capacity at airports in response to changing demographics, influence of emerging technologies, institutional changes, and other relevant factors.

While students will need to undertake a thorough literature search, some key documents and resource links to begin the process are listed on the Competition website as well as instructional videos on completing a Safety Risk Assessment and Guidance for Preparing Benefit Cost Analyses.

Photo Credits
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Guidelines for Design Submission

It is strongly recommended that participants review the Tips for Proposers section of the Competition website. Each of the following should be identified as a separate section of the design.

Design Package Components:

1. Main Body of the Design Submission
   The main body of the report must contain the following sections. There is a limit of 40 pages. Only required appendices are allowed. See format below.
   - Cover page to include: Title of Design; team member(s) name(s) and status (undergraduates or graduates); advisor(s) name(s) and university attending.
   - Executive Summary – 1 page.
   - Table of Contents with page numbers referenced for each section and appendix.
   - Problem Statement and Background on the Design Challenge being addressed. This section should demonstrate that the individual or team has a clear understanding of the issues surrounding the design challenge as well as current conditions and state-of-the-art approaches.
   - Summary of Literature Review. This is an overview of what was gleaned from the literature review with a discussion of primary sources and their influence on the design. Specific reference citations are to be provided in Appendix F.
   - Individual or Team’s Problem Solving Approach to the Design Challenge. This section should include a thorough description of individual’s or team’s work including a description of both interdisciplinary and systems engineering approaches as appropriate to solving the problem.
   - Safety Risk Assessment: The FAA promotes a culture of safety throughout all its operations. Examine existing FAA safety management system guidance as it relates to your proposed design solution. Consider inherent risks and describe how these risks should be addressed to ensure safe operations. Be sure to reference Introduction to Safety Management Systems for Airport Operators (FAA Advisory Circular 150/5200-37) and FAA Safety Management System Manual available under the Resources section of the Competition website. See video with additional guidance on this section at the Competition website.
   - Description of how the technical aspects of the Design Challenge are addressed through drawings, mockups, computer codes, etc. as appropriate to provide evidence of a thorough design process.
   - Description of interactions with airport operators and industry experts in the design process. Be explicit. Identify contacts and interactions. This is a required Competition component.
   - Description of the projected impacts of the team’s design and findings with a thorough discussion of how the design/solution meets ACRP goals. This section should address commercial potential for the design, including a description of processes that would need to be undertaken to bring the design to the product/implementation state. Emphasis should be on increased affordability and utility. This section should provide a financial analysis that reflects a realistic approach to projected cost/benefit determination and for the team’s design. Guidance for acceptable cost/benefit analyses for the purpose of the Competition is provided on the Competition website.

2. Appendices A-F as described below are required but not included in the 40-page limit. No other material may be included as an appendix.
   - Appendix A. List of complete contact information (use permanent addresses) for all advisors and team members. Include email, fax and phone numbers. This information is crucial as student participants may have graduated prior to receiving an award and all award checks are mailed directly to the participants.
   - Appendix B. Description (approximately one page) of the university or college.
   - Appendix C. Description of non-university partners involved in the project.
   - Appendix D. Sign-off form for faculty advisor(s) and department chair(s). Sign-off form is available at the Competition website.
   - Appendix E. Evaluation of the educational experience provided by the project. Evaluation questions for both student and faculty are provided on the Competition website.
   - Appendix F. Reference list with full citations using APA or other standard format. APA reference format is available at http://writing.wisc.edu/Handbook/Documentation.html.

Format:

Double-spaced, single-sided, minimum 12-point type, Times New Roman or Helvetica font. Captions and charts may be at a minimum of 10-point type. Pages, including appendices, must be numbered and referenced in Table of Contents.

Due Date: April 29, 2020

The design package shall be submitted electronically following guidelines provided at the Competition website. In addition, one hard copy of the full design plus the original sign-off form (available on Competition website) must be mailed to:

Virginia Space Grant Consortium
600 Butler Farm Road, Suite 2253,
Hampton, VA 23666.

All electronic and hard copy submissions must meet the 5 p.m. (Eastern Daylight Time) deadline on April 29, 2020. It is strongly recommended that a certified mail service be used. The faculty advisor will receive a submission acknowledgement via email.

By submission of the design package, Competition participants are agreeing that their design may be publicly shared.

vsgc.odu.edu/ACRPDesignCompetition
Awards and Key Dates

A cash award will be given to the student or shared equally among the student team members in each of the four technical design challenge areas as follows:

First Place - $3,000
Second Place - $2,000
Third Place - $1,000

First place award-winning team representatives will be invited to accept their award and present their design at a ceremony at the National Academies of Sciences, Engineering, and Medicine in summer 2020, date to be determined.

A travel allowance will be provided for two individuals from each first place winning team.

First place teams will also be invited to present their design at an appropriate Competition partner workshop or conference. Travel costs will be covered.

- Competition announcement August 2019
- Notice of Intent (NOI) is strongly encouraged but not required. The NOI allows Competition staff to facilitate connections with airport operators and industry experts. Fall semester NOI deadline is September 28, 2019. Spring semester NOI deadline is January 28, 2020.
- Design submissions will be accepted from November 2, 2019 through April 29, 2020.

Note: Students may work on their designs at any time throughout the Competition period.

- Winners will be announced in June 2020.
A call for solutions that accelerate the drawdown of 1 trillion tons of atmospheric carbon dioxide into agricultural soils

Many of the world’s largest industries have transformed and unlocked new value through digital systems innovation, and now’s the time for agriculture to do the same. The Terraton Challenge seeks to focus global innovators on agriculture as a climate solution.

The Terraton Challenge will focus on three critical areas:

- **Accelerate**: Increasing the speed at which carbon dioxide is sequestered and maintained
- **Quantify**: Catalyzing the next generation of soil carbon sampling & measurement systems
- **Reward**: Incentivizing growers to sequester soil carbon

**How It Works:**

PHASE 1
Jul. 23 - Oct. 1, 2019
Application

PHASE 2
Oct. 1 - Oct. 22, 2019
Cohort Selection

PHASE 3
Nov 2019 - Jan 2020
Incubation

PHASE 4
Feb - Oct 2019
Experimentation & Refinement

PHASE 5
Jun 2020
Demonstration

PHASE 6
Oct 2020
Award

**Why Participate:**

- **Prize Opportunities**: Up to $3.5K for submitting an idea; Up to $60K in grants; Up to $3M in contracts
- **Industry Visibility**: Demo your solution in front of thousands of stakeholders at Beneficial Ag 2020
- **Mentorship & Real-World Experimentation**: Get access to Indigo’s network of acres and the world’s largest agricultural lab to test your solution
- **Intellectual Property Preservation**: Maintain full ownership and complete IP rights to your solution
- **Addressing Climate Change**: Join a community of changemakers redefining agriculture as a climate solution

**Who Should Apply?**

- **All Stages**
- **All Geographies**
- **All Industries**

Any team or individual with an original solution to one of our Terraton Challenge categories should apply.

Learn more and apply now visit: [www.indigoag.com/the-terraton-challenge](http://www.indigoag.com/the-terraton-challenge) or email us at terratonchallenge@indigoag.com

The Terraton Challenge is subject to contest rules, terms and conditions located here. The Terraton Challenge is made up of two separate contests: an initial screening contest (“Round One”) and a semi-finalist contest (“Final Round”). By submitting an application, applicants are enrolling in Round One only. The only potential prize for Round One is an invitation to participate in the Final Round, subject to additional terms and conditions, acceptance of which are required to participate in such Final Round. Submission of an application to Round One does not guarantee participation in the Final Round. Only Round One winners are eligible to participate in the Final Round. Subject to additional terms, Final Round participants may be eligible for a chance to win a grant of up to $20,000.00 and one or more contracts with Indigo that may be worth up to $3 million in total. No purchase necessary to enter. Contests are void where prohibited.