JUMP into STEM
Professor Team Webinar #3

June 29, 2023

Yeonjin Bae, ORNL
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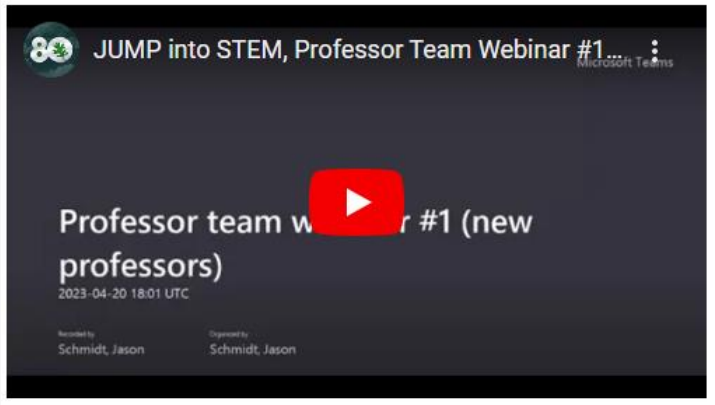
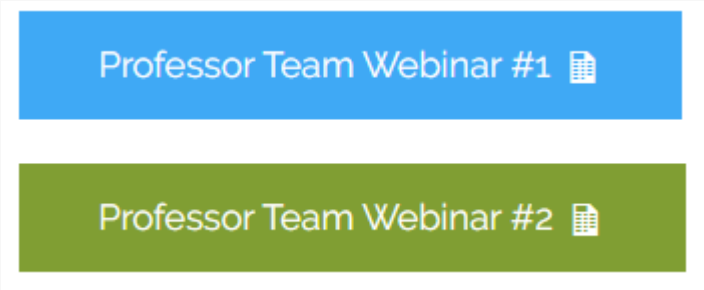
Today's Agenda

- 2023-2024 JUMP into STEM Professor team
- 2023-2024 JUMP into STEM Program updates
  - Student webinars
  - Industry partner visit
  - Evaluation criteria
- 2023-2024 Challenge topics and release date
- Feedback on DRAFT challenge topics
- Q&A

Professor Team Webinar

- Professor team webinar #1 for new professor team members
  - Recordings and the slide deck are available here
  - https://jumpintostem.org/professors/





JUMP into STEM Overview

- BTO-sponsored building science collegiate competition
- Student teams respond to one of three challenges
- Promotes ideation and diversity
- Awards include mentoring and paid internships
- 2023-2024 is sixth year of student competition

For more info:
www.jumpintostem.org

Process of the JUMP into STEM Competition

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Recruiting Professor Team

- Email notification
- Webinars for new and returning professors
- Supporting materials for course

Announcement of Challenge Topics

- Email notification
- Webinars for professor team
- Webinar for potential participants
- Share materials on the official website

Idea Submissions

- Submit the idea
- Apply for the internship opportunity

Judge

- Assign judges to each submission
- Select the winner and runner-up team in each challenge topic
- Select the finalist teams

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JUMP into STEM Professor Team

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2023-2024 Professor Team

Join the JUMP into STEM Professor Team!

Your Role and Activities:

- The Professor Team connects DOE's goals within the Challenges to university students.
- Engage with JUMP into STEM team to provide feedback on potential challenges and updates during the competition
- Incorporate at least one (1) challenge into an appropriate Fall 2023 course as part of the student's grade
- Support students on research and submissions
- Promote JUMP into STEM to other university stakeholders.

JUMP into STEM participants Jarrett Thomas and Jai Huntley, and Hampton University Professor Laura Battaglia

For more info:
https://jumpintostem.org/professors/

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The 2023-2024 Professor Team

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2023–2024 Professor Team

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★ New to the Team in 2023
★ HBCU/MSI/HSI

Dr. Davide Ziviani
Purdue University
Mechanical Engineering

Dr. Zoltan Nagy★★
The University of Texas at Austin
Architectural and Environmental Engineering

Liane A Hancock★
University of Louisiana at Lafayette
Architectural and Environmental Engineering

Dr. Karl Heine
Embry-Riddle Aeronautical University
Mechanical Engineering

Dr. Liang Zhang ★★
University of Arizona
Civil Engineering and Engineering Mechanics

Dr. Mohammad Heidarinejad★
Illinois Institute of Technology
Architectural Engineering

Dr. Allison Mahvi★
University of Wisconsin, Madison
Mechanical Engineering

Dr. Rania Labib★
Prairie View A&M University
Architecture

Dr. Shahin Shafiee★★
Prairie View A&M university
Mechanical Engineering

Dr. Yao Yu
North Dakota State University
Construction Management and Engineering

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★ New to the Team in 2023

★ HBCU/MSI/HSI

Dr. Somayeh Asadi★
Pennsylvania State University
Architectural Engineering

Dr. Moe Alahmad
University of Nebraska-Lincoln
Electrical Engineering

Dr. Bilal Alhawamdeh★
Western Michigan University
College of Engineering and Applied Sciences

Dr. Hessam Taherian ★
Pennsylvania State University
School of Science, Engineering, and Technology

Dr. Nelson Fumo
University of Texas at Tyler
Mechanical Engineering

Dr. Heather E. Dillon
University of Washington
Mechanical Engineering

Dr. Mehdi Mortazavi★
Worcester Polytechnic Institute
Mechanical & Materials Engineering

Dr. Aysegul Demir★
University of Wyoming
Civil & Architectural Engineering

Dr. Manish Dixit★
Texas A&M University
Construction Science

Dr. Suresh Dhaniyala★
Clarkson University
Mechanical and Aerospace Engineering

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★ HBCU/MSI/HSI

Dr. Thomas D. Tran
Indiana Tech
Mechanical Engineering

Dr. Hassan Qandil ★★
University of North Texas
Mechanical Engineering

Dr. Endong Wang ★
SUNY College of Environmental Science and Forestry
Sustainable Construction

Dr. Behnam Shadravan ★
Florida A&M University
Construction Engineering Technology

Dr. Dalya Ismael ★
Old Dominion University
Engineering Technology

Dr. Sesha Srinivasan ★
Florida Polytechnic University
Engineering Physics

Dr. Patrick Tebbe
Minnesota State University
Mechanical Engineering

Kathryn Jackson ★★
Northern Oklahoma College
Renewable Energy

Dr. Manohar Chamana ★★
Texas Tech University
Wind Energy Program

Dr. Nancy Landreville
University of Maryland Global Campus
Applied Mgmt and Decision Science

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★ New to the Team in 2023

★ HBCU/MSI/HSI

Dr. Mookesh Dhanasar ★★
North Carolina A&T State University
Mechanical Engineering

Next Steps

- Interested in joining the Professor Team?
- Please email me by **June 30.**
  - Yeonjin Bae (baey@ornl.gov)
  - Include names of Fall courses that might include a JUMP into STEM challenge

2023-2024 JUMP into STEM Program Updates

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Student Webinars

- Two student webinars will be provided
- Webinar 1 (End of August)
  - JUMP into STEM overview
  - Challenge topics and evaluation criteria
  - **Tech-to-Market Plan** and **Cost/Benefit Analysis**
  - Submission template
- Webinar 2 (October)
  - Submission guidance
  - Internship application
  - National laboratories
  - Previous winners

Industry Partner Visit Pilot

- **A new benefit** for competition winners and Industry Partners
- **Two days of direct engagement** between JUMP into STEM interns and select 2022-2023 JUMP into STEM Gold or Platinum Sponsor(s).
  - Internship project presentations
  - An extended tour of Clayton's Appalachia production facility in Andersonville, TN
  - Networking sessions

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Join the discussion, Unveil innovation, Make connections, Promote tech-to-market

INDUSTRY PARTNER VISIT OPPORTUNITY

SUMMER 2024 PROGRAM

Following a summer 2023 pilot, JUMP into STEM is continuing the Industry Partner Visit benefit for competition winners and up to three Industry Partners. This two-day event allows select 2023-2024 JUMP into STEM Gold or Platinum Sponsors to bring competition winners to their facility for direct engagement.

Focused on illustrating the role and capabilities of industry in technology commercialization, the Industry Partner Visit will include in-person tours, networking sessions, and unique engagements specific to the Industry Partner, all completed concurrently with the winner's 10-week national laboratory internship. The JUMP into STEM management team will work with the Industry Partners to organize and plan the visit.

For summer 2024, we are looking for up to three Industry Partners (2023-2024 Gold or Platinum Sponsors) to engage with national lab student interns. Contact us today to learn more!

ABOUT THE COMPETITION

JUMP into STEM is a nationwide competition for undergraduate and graduate students at U.S. academic institutions that aims to inspire the next generation of building scientists. With diversity at the forefront of the program, JUMP into STEM emphasizes the inclusion of an interdisciplinary mix of majors (e.g., computer science, mathematics, economics, policy, engineering) and students underrepresented in the building science field.

Learn more at www.jumpintostem.org.

LEVELS OF SPONSORSHIP

- **Platinum:** $20,000+
  Gold benefits plus opportunity to name a winning internship slot on behalf of your organization (i.e., Company XYZ Internship Winner)
- **Gold:** $10,000–$19,999
  Silver benefits, plus invitation to participate as a judge during the competition, PLUS eligibility in the JUMP into STEM Industry Partner Visit program
- **Silver:** $5,000–$9,999
  Bronze benefits plus invitation to Final Competition
- **Bronze:** $3,500–$4,999
  Organizational logo on JUMP into STEM website and communications materials, including the Final Competition program and results articles distributed to 40,000+ recipients

POINT OF CONTACT

Bill Eckman, Oak Ridge National Laboratory
(865) 341-1964, eckmanwe@ornl.gov

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Clayton home building group

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2023-2024 Challenge Topics!

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- **The three challenge topics are:**
  - **You and Me, Carbon Free!**
  - **Keepin' it Cool (or Hot)**
  - **Equitable Envelopes**

Thank you for your feedback on selecting this year's challenge topics!

- **2023-2024 Challenge launch date: August 1. 2023**

Idea Submission

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Project Team Background

- 2-page max
- Project name, team name, and collegiate institution
- Team's mission statement
- Short bio for each team member
- Diversity statement
  - minimum 1 paragraph, 5–7 sentences

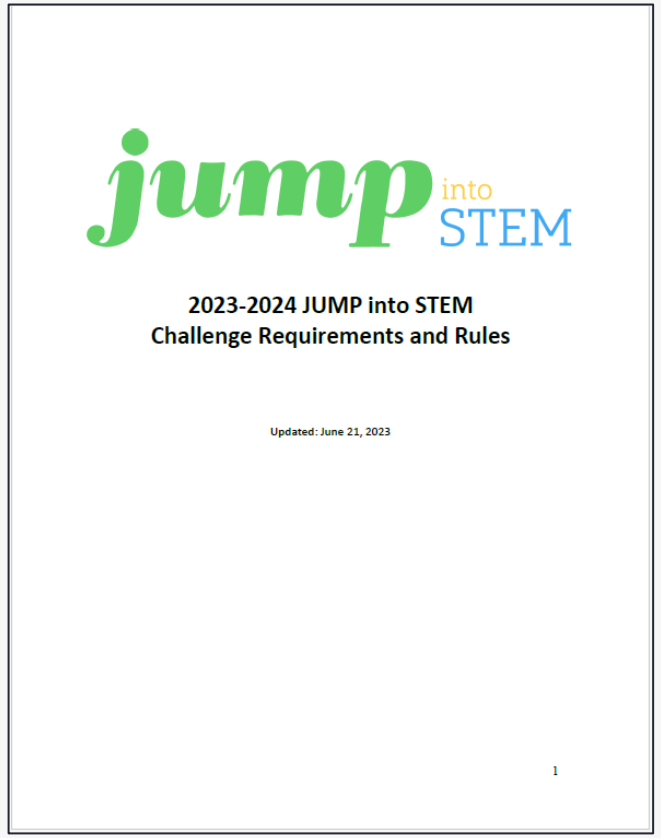
Plagiarism will not be tolerated. The quality of writing will be considered, so review by peers is strongly encouraged.

Project Challenge Submission

- 5-page max
- Provide a **background** of your selected Challenge and related stakeholders
- **Problem statement:**
  - Identify stakeholder(s)
  - identify the injustices (energy or environmental)
- **Solution**
  - Technical solution + one or more of the following components
    - Economic, policy, commercialization, codes and standards, and/or other
- **Technology-to-market plan**
  - cost/benefit and market adoption barrier analysis

Rules Document

- Summary of important dates
- Tasks overview
- Submission paper instructions
- Challenge evaluation criteria
- Final competition presentation instructions
- Final competition evaluation criteria
- Internship application instructions



DRAFT Challenge Evaluation Criteria

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Solution (40%)

- Solution
- Feasibility
- Novelty
- Impact

Market Readiness (30%)

- Market characterization
- Technology-to-market
- Overcoming adoption barriers

Diversity and Justice (20%)

- Diversity statement and project team background
- Environmental and energy justice

Submission (10%)

- Submission requirements

DRAFT Final Competition Evaluation Criteria

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Solution (30%)

- Solution
- Feasibility
- Novelty
- Impact

Diversity and Justice (20%)

- Multidisciplinary Team Approach
- Environmental and energy justice

Market Readiness (25%)

- Market characterization
- Technology-to-market
- Overcoming adoption barriers

Presentation (25%)

- Effective delivery of ideas
- Presentation preparation
- Question & Answers

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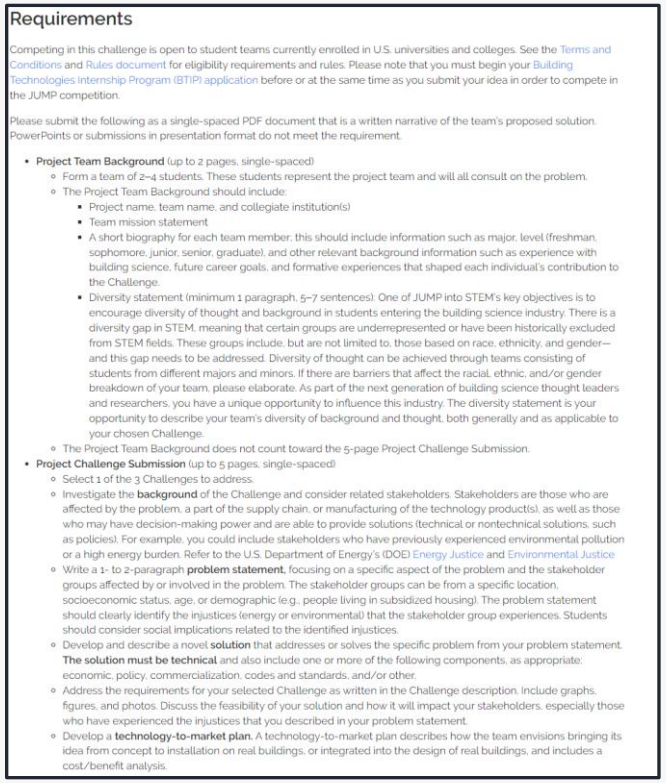
The 2023-2024 DRAFT Challenge Topics

Challenges

- Background
- Technical Overview
- The Challenge
- **Requirements**
- **Evaluation Criteria**



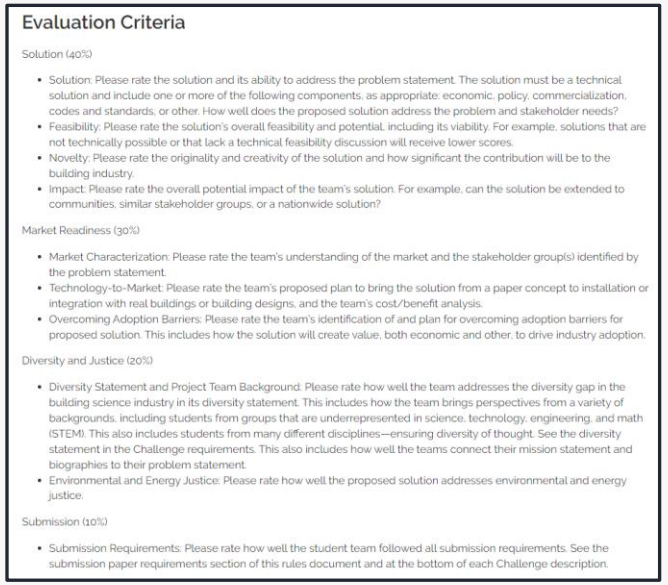
Requirements

Competing in this challenge is open to student teams currently enrolled in U.S. universities and colleges. See the Terms and Conditions and Rules document for eligibility requirements and rules. Please note that you must begin your Building Technologies Internship Program (BTIP) application before or at the same time as you submit your idea in order to compete in the JUMP competition.

Please submit the following as a single-spaced PDF document that is a written narrative of the team's proposed solution. PowerPoints or submissions in presentation format do not meet the requirement.

- **Project Team Background** (up to 2 pages, single-spaced)
  - Form a team of 2–4 students. These students represent the project team and will all consult on the problem.
  - The Project Team Background should include:
    - Project name, team name, and collegiate institution(s)
    - Team mission statement
    - A short biography for each team member; this should include information such as major, level (freshman, sophomore, junior, senior, graduate), and other relevant background information such as experience with building science, future career goals, and formative experiences that shaped each individual's contribution to the Challenge.
    - Diversity statement (minimum 1 paragraph, 5–7 sentences): One of JUMP into STEM's key objectives is to encourage diversity of thought and background in students entering the building science industry. There is a diversity gap in STEM, meaning that certain groups are underrepresented or have been historically excluded from STEM fields. These groups include, but are not limited to, those based on race, ethnicity, and gender—and this gap needs to be addressed. Diversity of thought can be achieved through teams consisting of students from different majors and minors. If there are barriers that affect the racial, ethnic, and/or gender breakdown of your team, please elaborate. As part of the next generation of building science thought leaders and researchers, you have a unique opportunity to influence this industry. The diversity statement is your opportunity to describe your team's diversity of background and thought, both generally and as applicable to your chosen Challenge.
  - The Project Team Background does not count toward the 5-page Project Challenge Submission.
- **Project Challenge Submission** (up to 5 pages, single-spaced)
  - Select 1 of the 3 Challenges to address.
  - Investigate the **background** of the Challenge and consider related stakeholders. Stakeholders are those who are affected by the problem, a part of the supply chain, or manufacturing of the technology product(s), as well as those who may have decision-making power and are able to provide solutions (technical or nontechnical solutions, such as policies). For example, you could include stakeholders who have previously experienced environmental pollution or a high energy burden. Refer to the U.S. Department of Energy's (DOE) Energy Justice and Environmental Justice
  - Write a 1- to 2-paragraph **problem statement**, focusing on a specific aspect of the problem and the stakeholder groups affected by or involved in the problem. The stakeholder groups can be from a specific location, socioeconomic status, age, or demographic (e.g., people living in subsidized housing). The problem statement should clearly identify the injustices (energy or environmental) that the stakeholder group experiences. Students should consider social implications related to the identified injustices.
  - Develop and describe a novel **solution** that addresses or solves the specific problem from your problem statement. **The solution must be technical** and also include one or more of the following components, as appropriate: economic, policy, commercialization, codes and standards, and/or other.
  - Address the requirements for your selected Challenge as written in the Challenge description. Include graphs, figures, and photos. Discuss the feasibility of your solution and how it will impact your stakeholders, especially those who have experienced the injustices that you described in your problem statement.
  - Develop a **technology-to-market plan**. A technology-to-market plan describes how the team envisions bringing its idea from concept to installation on real buildings, or integrated into the design of real buildings, and includes a cost/benefit analysis.

Examples of the *Requirements*



Evaluation Criteria

Solution (40%)

- Solution: Please rate the solution and its ability to address the problem statement. The solution must be a technical solution and include one or more of the following components, as appropriate: economic, policy, commercialization, codes and standards, or other. How well does the proposed solution address the problem and stakeholder needs?
- Feasibility: Please rate the solution's overall feasibility and potential, including its viability. For example, solutions that are not technically possible or that lack a technical feasibility discussion will receive lower scores.
- Novelty: Please rate the originality and creativity of the solution and how significant the contribution will be to the building industry.
- Impact: Please rate the overall potential impact of the team's solution. For example, can the solution be extended to communities, similar stakeholder groups, or a nationwide solution?

Market Readiness (30%)

- Market Characterization: Please rate the team's understanding of the market and the stakeholder group(s) identified by the problem statement.
- Technology-to-Market: Please rate the team's proposed plan to bring the solution from a paper concept to installation or integration with real buildings or building designs, and the team's cost/benefit analysis.
- Overcoming Adoption Barriers: Please rate the team's identification of and plan for overcoming adoption barriers for proposed solution. This includes how the solution will create value, both economic and other, to drive industry adoption.

Diversity and Justice (20%)

- Diversity Statement and Project Team Background: Please rate how well the team addresses the diversity gap in the building science industry in its diversity statement. This includes how the team brings perspectives from a variety of backgrounds, including students from groups that are underrepresented in science, technology, engineering, and math (STEM). This also includes students from many different disciplines—ensuring diversity of thought. See the diversity statement in the Challenge requirements. This also includes how well the teams connect their mission statement and biographies to their problem statement.
- Environmental and Energy Justice: Please rate how well the proposed solution addresses environmental and energy justice.

Submission (10%)

- Submission Requirements: Please rate how well the student team followed all submission requirements. See the submission paper requirements section of this rules document and at the bottom of each Challenge description.

Examples of the *Evaluation Criteria*

https://jumpintostem.org/challenge/2022_sustainable-resilient/

You and Me, Carbon Free!

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The Challenge

This challenge asks student teams to develop an innovative solution that will **reduce carbon emissions in buildings**. Students can focus on **any aspect related to carbon emissions**, including but not limited to **embodied carbon**, **carbon sequestration and capture**, and **operational carbon emissions**. Teams should first develop a focused problem statement for a specific stakeholder group and then develop a technical solution or process.

You and Me, Carbon Free! (cont.)

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- Suggestions for student teams include (but are not limited to) the following:
  - Create innovative **design strategies and practices**, such as:
    - Retrofitting building strategies that **optimize both embodied and operational carbon reduction**
    - **Building demolition and separation practices** that **reduce waste and embodied carbon**
    - Recovering, reusing, and remanufacturing practices of and for building materials that reduce waste and embodied carbon
    - Industrializing building construction processes
  - Develop **new materials or manufacturing processes** that could:
    - Reduce both embodied and operational carbon
    - Capture and store CO2
  - Present solutions with advanced controls that **optimize building operation and minimize carbon emissions.**

Keepin' it Cool (or Hot)

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The Challenge

This challenge asks student teams to develop an innovative solution for **thermal energy storage for buildings** to optimize energy utilization, enhance sustainability, and increase resilience. Furthermore, the **cost for implementing TES** should be affordable or recoverable from the benefits provided by the TES. The solutions could involve (but are not limited to) **integration of materials, systems, and controls for the storage and release of energy.** Teams should first develop a focused problem statement for a specific stakeholder group and then develop a technical solution or process.

Keepin' it Cool (or Hot) (cont.)

- Suggestions for student teams include (but are not limited to) the following:
  - Create **innovative design strategies** and practices specifically aimed at **integrating TES in buildings**.
  - Develop TES solutions utilizing **building materials, structure, and/or building's heating, cooling or water heating systems**.
  - Present solutions with **advanced controls**, or **innovative business models**, for utilizing TES that can maximize the benefits of TES (e.g., reducing energy cost, shedding electric demand during peak periods, and/or utilizing more available renewable power) with acceptable cost to consumers.

Equitable Envelopes

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The Challenge

This challenge asks student teams to address the **inequity** that various communities face from **energy burden** by developing an innovative solution that allows building owners to **access high-quality and affordable envelope remediation** or **construction technologies**, **strategies,** or **methods**. Students may consider solutions to address **air leakage**, **moisture durability**, and/or **thermal performance of the envelope** for **new or existing residential buildings**. Students must target solutions that are cost-effective, affordable, and accessible to disadvantaged communities.

Equitable Envelopes (cont.)

- Suggestions for the student teams include (but are not limited to) the following:
  - Develop innovative solutions to **detect and seal air leakage through the building envelope**
  - Develop solutions to **predict, assess, or evaluate the moisture performance** of the building envelope
  - Develop solutions to **add insulation to existing building envelope elements—walls, roof, foundation, etc.**
  - Develop **rebate or education programs** to promote the remediation of existing building envelopes to **increase accessibility to disadvantaged communities**
  - Develop **cost-effective, accessible solutions** to improve the **air, water, and/or heat control** of the envelope for **new residential buildings**.

Feedback on challenge topics

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- Any feedback on challenge topics?
- Any suggestions for your students?

Next Meeting

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Professor Team Webinar #4 for all professor team members

- Will be scheduled on the week of August 14th

Professor Team Webinar #4

- Program updates
- Website overview
- Submission guideline
- Submission template
- Submission tips

THANK YOU!

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Questions?

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Q&A