

SAME
College Outreach COI
Encouraging Student
Competition Involvement

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Overview

- Motivation
- Focus
- Available Student Competitions
- Initial SAME-centric Competition Thoughts
- Pros/Cons
- Final Thoughts
- How do we incentivize student chapter participation?
- How would host a Virtual Student Chapter team?

Motivation

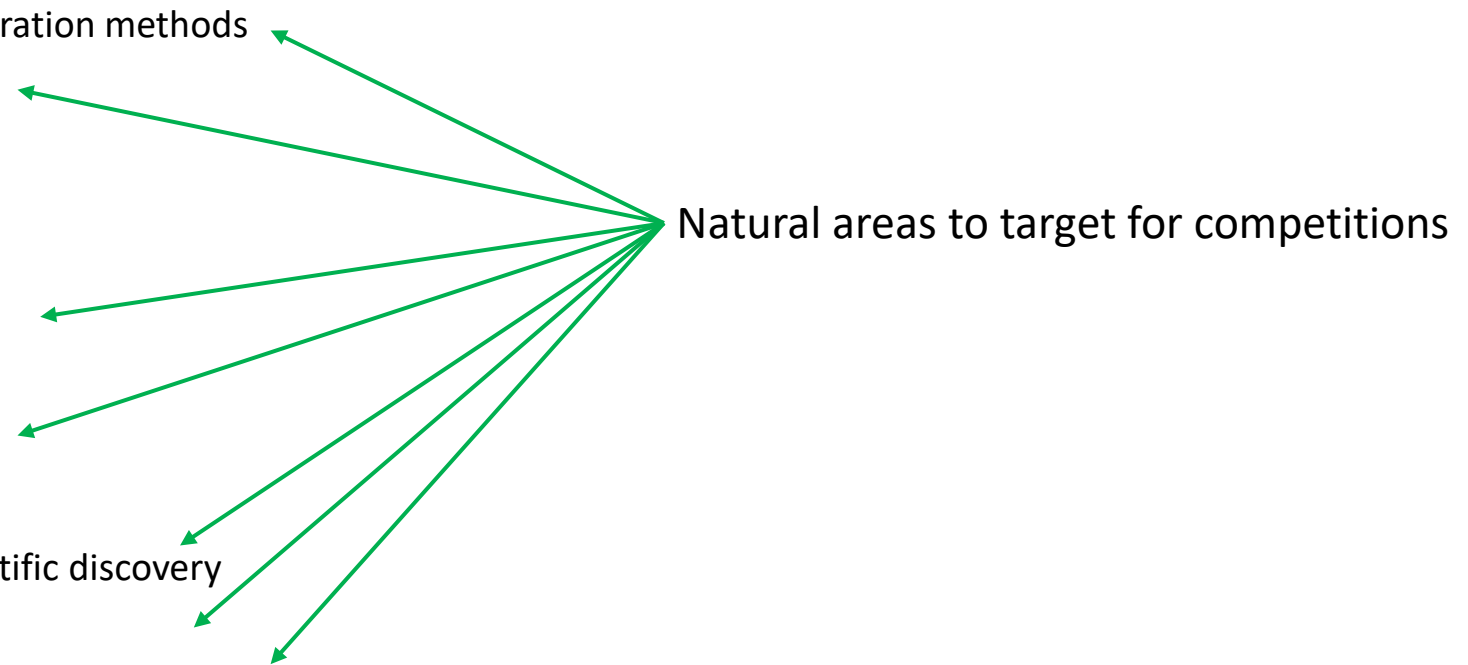
- **Energize** the student chapters
- 30+ student chapters offer a great opportunity
 - Localized student-led think tanks for implementing innovative ideas
 - Provide an avenue to gain engineering experience
- Local SAME chapters available to provide mentoring
 - Built-in support network
 - Transition from concept to reality

Focus

- National Academy of Engineering **Grand Challenges**
 - Sustaining civilization's continuing advancement as the population grows and its desires expand, while still improving quality of life
 - 14 areas of research
 - Tackling the engineering issues facing society's future
- Build SAME-based competition around this endeavor
 - Paper competition with the goal to expand to physical build
- Test the waters with current competitions

Focus – Parallel NAE's **Grand Challenges**

- **Brain Engineering:** Reverse-engineering the brain
- **Carbon Sequestration:** Developing carbon sequestration methods
- **Clean Water:** Providing access to clean water
- **Cyberspace:** Securing cyberspace
- **Energy Availability:** Providing energy from fusion
- **Health Informatics:** Advancing health informatics
- **Human Learning:** Advancing personalized learning
- **Medical Engineering:** Making better medicines
- **Nitrogen Cycle:** Managing the nitrogen cycle
- **Nuclear Mitigation:** Preventing nuclear terror
- **Scientific Discovery:** Engineering the tools of scientific discovery
- **Solar Energy:** Making solar energy economical
- **Urban Infrastructure:** Restoring and improving urban infrastructure
- **Virtual Reality:** Enhancing virtual reality



Competitions

- NASA-Dust Mitigation Technologies for Lunar Applications: <http://bigidea.nianet.org/>
- NASA-Augmented Reality Display Design for Suits: <https://microgravityuniversity.jsc.nasa.gov/nasasuits.cfm>
- NASA-Robotic Mining Competition: <https://www.nasa.gov/offices/education/centers/kennedy/technology/nasarmc.html>
- NASA-Urban Air Mobility (closed): <https://www.nasa.gov/aeroresearch/resources/design-competitions>
- IEEE-Brown Bag 1-Circuits-Lab Design: <https://attend.ieee.org/r2sac-2020/competitions/>
- IEEE-Brown Bag 2-Arduino Design: <https://attend.ieee.org/r2sac-2020/competitions/>
- IEEE-Brain to Computer Interface (control drone with mind – closed): <https://site.ieee.org/baltimore/b2ci/>
- IEEE-Micro-Mouse Competition: <https://attend.ieee.org/r2sac-2020/competitions/>
- IEEE-Sumo Bot Challenge: <https://attend.ieee.org/r2sac-2020/competitions/>
- Walking Robot Challenge
- Steel Bridge Competition
- USAR Competitions for physically situated robots
- ASME Human Powered Vehicle
- SourceAmerica-Assistive Technologies: <https://www.instituteforempowerment.org/design-challenge/home>
- ACM Student Research Competitions (general research): <https://src.acm.org/submissions>
- NIH Biomedical Competition: <https://venturewell.org/debut/>
- SME-Digital Manufacturing for Rapid Medical Response (3D printing): <https://www.sme.org/digital-manufacturing-challenge>
- ASME-Building to the Sky (with paper!): https://resources.asme.org/efest-rules-sdc-2020?_ga=2.28277112.571283967.1597669510-684297909.1597669510
- Biomimicry: Nature-inspired solutions: <https://challenge.biomimicry.org/en/>
- Energy.gov: Collegiate Wind Competition: <https://challenge.biomimicry.org/en/>
- Energy.gov: Solar District Cup: <https://challenge.biomimicry.org/en/>
- Energy.gov: Solar Decathlon: <https://challenge.biomimicry.org/en/>
- Energy.gov: EcoCAR Mobility Challenge: <https://challenge.biomimicry.org/en/>
- EPA-Campus RainWorks Challenge: <https://www.epa.gov/green-infrastructure/campus-rainworks-challenge-0>

Initial Thoughts on SAME-centric Competition

- Note: the SAME competition is still 1-2 years away; this is the preliminary hack
- **April** Announce competition topic and specs
- **April-May** Student chapters convene to discuss their interest in the competition/topics
- **May-August** SAME works with student chapter mentors to prep chapters for participation
- **September** Students return to school and being working on concept papers
- **October** Concept papers due
- **November** Concept papers reviewed, and chapters selected to submit full proposals
- **Dec - Mar** Chapters develop full proposals
- **April** Full proposals due. Proposals reviewed and selected
- **May** Winning proposals invited to present at JETC

Initial Thoughts on SAME-centric Competition

- **Challenge:** Does the submission do an adequate job of explaining the problem/issue to be solved and how their solution addresses it?
- **Innovation.** Does the submission represent a novel way of applying a multidisciplinary solution?
- **Marketability/Economic Viability.** Does the submission stand a good chance of getting to market if given the right resources? Is a business plan included?
- **Rigor.** Does the submission represent a sound understanding of the technical, scientific, and societal factors at play?
- **Multidisciplinary Teamwork.** Does the submission represent input and contributions by a multidisciplinary team (3 or more disciplines with at least one discipline falling outside the A/E/C industry) representing more than one engineering society?
- **Industry.** Does the submission reference prospective industry partners that might be interested in the solution?
- **Social Influence.** Does the submission address any attitudinal changes necessary by relevant segments of society for the solution to be adopted?

All Pros!

(cons – there is some work to do to get it going – it's totally doable)

- Great opportunity to get students involved
 - Publishable research
 - Patents
 - Private industry adoption
- Laying groundwork for SAME-hosted competition
- Community effort for developing the competition
- Students gain experience
- Possible marketable solution

Final Thoughts

- Please let me know your ideas
- Please find a competition that you feel you can field a team for
- Please canvas student chapters for fielding a team
- Please record your experience/lessons learned
- Please provide input/suggestions
 - How are you incentivizing participation
 - Thoughts for hosting a *virtual* team
- **Let's give it a go!**

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