

Georgia Institute of Technology K-12 STEM Summit

November 20, 2017

The inaugural K-12 STEM Summit was held on November 20, 2017 at the Georgia Tech Global Learning Center. Approximately 100 faculty, staff and administrators representing all colleges, GTRI, the Office of the Provost, Institute Diversity, Government and Community Relations, Office of the Arts and other campus units, participated in the full day event. Provost Rafael Bras welcomed the group and set the agenda for the day (LINK TO AGENDA). Plenary speaker, Dr. Kathleen Bergin, Program Director, National Science Foundation, delivered a talk entitled, “The Role of Public Research Universities in K-12 Education” (LINK TO KATHLEEN’S SLIDES).

Twenty-nine lightning talks (2:20 minutes; one slide) featuring current K-12 STEM programs offered by GT faculty and staff were presented. These included teacher professional development opportunities, dual enrollment courses, community outreach programs, summer camps, after school programs, Saturday Science programs, competitions, student internships, field trips, curriculum development efforts, school partnerships, in-class presentations, educational research projects, pre-teaching advising, apprenticeship development, mentoring and tutoring.

A luncheon panel of campus leaders (DeMillo, Isbell, Kohn, Goldbart, McCook, Jacobs) shared their perspectives on GT’s role in K-12 STEM Education and entertained questions from the audience.

After lunch, participants broke into 5 discussion groups. Summaries from those groups are provided below:

Local and State Role and Impact (Sheheane)

At present, Georgia Tech has a lot going on in K-12 STEM Education, but it feels disjointed and driven by faculty and staff interests rather than an institutional commitment. Policymakers are keen on efforts to improve educational opportunities and workforce development in Atlanta and the state of Georgia. Strong connections with Georgia’s high schools will help us recruit the best students in the state into our programs. As a key node in Georgia’s educational ecosystem, it seems important for Georgia Tech to be able to articulate and make good on its role in support of K-12 STEM education.

Georgia Tech is the premier STEM institution in the state and is heavily involved in K-12 STEM education. Housed in the College of Sciences, CEISMC has great name recognition around the state and has unique expertise in taking high-end faculty research, explaining it at a K-12 level, and demonstrating how it is applicable in the “real-world”. CEISMC is well known for its curriculum development (AMP It UP), teacher professional development (GIFT, PBIL, STEM Leadership Academy, code.org training), and student programs (Horizons, PEAKS, Inventure Challenge, GoSTEM). CEISMC has an impressive record of federal, state and private funding for its programs and actively publishes in professional outlets. The College of Computing has been instrumental in influencing state computer science standards, training computer science teachers, and offering high demand computer science summer camps. The College of Engineering has collaborated with CEISMC on several NSF-funded projects to integrate engineering and

design into middle and high school curricula, supported the K-12 Inventure Challenge and developed innovative programs to engage underrepresented high school students in engineering (CEED and Project ENGAGES). GTRI offers a full complement of K-12 internships, campus visits, teacher workshops, and community outreach.

In the future, Georgia Tech might choose to focus more on increasing its visibility in the community, with political constituents, and with parents. At present, we might be seen as “not caring because we already have enough students applying”. We should try to shift that focus to a commitment to increasing the diversity of students applying to Tech through our outreach programs and increasing the numbers of students interested in STEM careers by providing good career guidance and examples of the wide range of STEM career opportunities. We should challenge ourselves to reach out to rural schools and underserved communities throughout the state.

Georgia Tech should demonstrate an institutional commitment to strengthening the K-12 STEM pipeline, starting at elementary school, to complement and support the considerable grass roots interest demonstrated at this Summit. We should also strengthen our relationships with the Georgia Department of Education, the RESA’s and other educational entities around the state (e.g. Colleges of Education) and leverage partnerships with organizations with an educational focus, such as Georgia Public Broadcasting to improve STEM education. It seems important to be able to create new and sustain effective programs to offer a well-coordinated and high-quality range of K-12 STEM programs and services.

Regional and National Role and Impact (Clark)

As a state institution, Georgia Tech has primary responsibility to serving the State of Georgia, but it also can serve as a leader in K-12 STEM Education at the regional and national levels. Georgia Tech (CEISMC) has had several educational research and curriculum development grants from NSF, NASA, and US Department of Education that have been disseminated nationally. Georgia Tech hosts the regional SIEMENS Competition each year. In 2017, we hosted the SeaPerch competition. This type of visibility helps lift the profile of Georgia Tech in general, change public perception of Georgia as a “backward place” and may help with recruitment at a regional and national level. If we are to realize regional and national impact, and be recognized as a national thought leader, we must communicate our K-12 accomplishments more effectively and to a broader audience than we do currently.

SWOT Analysis (Leavey)

Strengths: Expertise in cutting edge educational research and best practices in teacher professional development, STEM curriculum and pedagogy, and outreach through CEISMC; Grass roots commitment from all units and all levels (students, faculty, staff, administrators; Proximity to large numbers of K-12 students and teachers; Strong name recognition and reputation as a thought leader in STEM; Strong presence in Atlanta metro area.

Weaknesses: Lack of central infrastructure (master calendar, central registration and database, background checks, volunteer recruitment, risk management, quality control; publicity and marketing)

results in redundancy, inefficiency, unmitigated risk and poor service to community; Lack of diversity in GT faculty and students (underrepresentation of African Americans, women); Price of teacher professional development and student summer programs are high compared to other providers; Allocation models leads to instability in program offerings (when grant runs out even successful programs end); Limited rural outreach; Reward and recognition for K-12 engagement uneven across units; Limited visibility, marketing, communications of Georgia Tech's K-12 engagement.

Opportunities: Improved messaging and communication; Better tracking of participants for use in undergraduate recruitment; Georgia Tech could be a leader in K-12 STEM engagement at local, state, regional and national level; A public space to showcase GT would streamline field trips, help engage community stakeholders and improve reputation of GT as an accessible community resource; Collaborating with other Georgia institutions of higher education on K-12 issues.

Threats: Liabilities and risks associated with minors on campus; Performance of Georgia's K-12 students continues to track below national average—jeopardizing the quality of our student body/Georgia workforce; National climate and funding for education; Being satisfied with status quo—continuing to work in silos and not reach full potential/impact; Failure to satisfy public's requests—further contributing to disillusionment with higher education.

Infrastructure and Support (Lefton)

As we saw at this Summit, K-12 activity is occurring across the Georgia Tech campus. The fact that so many faculty, staff and students are engaged with K-12 education is impressive, but it is also clear that decentralization reduces coherence and efficiency, makes it difficult to capture impact, and limits our capacity to “tell the story” of Georgia Tech's K-12 involvement. Participants expressed a desire for central infrastructure for K-12 STEM engagement that included:

- A **K-12 Portal and calendar** listing all K-12 activities (by level, type of activity, date) so that internal (campus) and external stakeholders (parents, teachers, students, community members) can easily find out what is going on in K-12 at Georgia Tech.
- **Regulatory and Risk Management** (IRB, background checks, minors on campus, safety) assistance to ensure that all K-12 programs are in compliance and documented appropriately.
- A **single point of contact** for school personnel to arrange for speakers, judges, volunteers, field trips, professional development opportunities, and student experiences. At present, these requests come in through many points on campus. Schools complain that many times they do not get any response from Tech. Requests are handled differently depending on who receives them. Consistency from year to year is lacking.
- **Facilities and Space** arrangements that are fair and consistent.
- **Common registration and participant database** so that we can record who attends our events over time, improve marketing and recruiting and track impact.
- **Volunteer recruitment.** At present, everyone recruits their own volunteers and people who want to volunteer must sign up on several lists. This would streamline the process.
- There was considerable discussion about who owns **Dual Enrollment** at Tech and what guidelines are in place for development of new courses/evaluating existing offerings.
- **Parking** is a recurring issue for K-12 programs. There is a perception that the rules are different for different programs and that an Institute policy is needed.

- A **Visitor’s Center** with room for K-12 and community activities would greatly enhance Tech’s accessibility and capacity to serve external stakeholders.
- **Grant writing Support**, for assistance writing educational research grants, help with the broader impact sections of NSF proposals, and partnering on the education/workforce development aspects of Center proposals.
- A **plug and play model for camps and teacher professional development** in which campus units would provide the STEM content and activities and a central unit would handle recruitment, staffing, space, food, and all logistics.

Indicators of Success and Impact (Spencer)

Greater clarity regarding Georgia Tech’s role in K-12 education and a corresponding “culture change” in the way we incentivize and track K-12 engagement are necessary before we can assess the success and impact of Georgia Tech’s engagement with K-12 schools. Efforts to date have been largely decentralized and while there are many examples of impact for an individual project or event---there are no metrics for Georgia Tech as an institution. Possible metrics might include:

- # of proposals submitted with “very good”- “excellent” broader impacts statements
- # of students who were engaged in K-12 programs who apply to/enter Georgia Tech (especially underrepresented groups).
- Greater STEM literacy among Georgia students (Georgia Milestones; NAEP)
- Greater interest in STEM among Georgia students
- Improved STEM pathways in Georgia Education Ecosystem (policy changes)
- Georgia Tech as a national leader in best practices in STEM education (citations; advisory boards; awards)
- # of Georgia Tech students engaged in K-12 outreach (service learning; volunteer)
- # of Georgia counties sending students to Georgia Tech

To conclude, Provost Bras remarked on the breadth of K-12 engagement evident at the Summit. He commended the participants for their passion and commitment to supporting K-12 students and teachers. He noted that he would be reaching out to obtain advice on how to move forward with this effort and encouraged participants to contact him with their thoughts and opinions.