



SySTEAM mini-conference

July 27th & 28th, 2023

Virtual/online

Informational packet and conference guide

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Welcome

An open letter from the SySTEAM Program Director to the attendees of this year's mini-conference.

Dear mini-conference attendees:

Thank you for registering for the 2023 mini-conference! Regardless of whether you're a regular at SySTEAM community meetings or if it's your first time at a SySTEAM Initiative event, SySTEAM is happy to have you joining us.

As it happens, this mini-conference is a particularly exciting one for SySTEAM, as it's not only the first-ever SySTEAM mini-conference (a momentous occasion in itself!) but additionally marks a new chapter in the INCOSE SySTEAM Initiative's continuing saga.

Since its inception in 2021, the INCOSE SySTEAM Initiative has had the mission of "improving education for all students, everywhere", in reflection of SySTEAM's long-term goal of ensuring that every student, regardless of where they live or what career they pursue, has the chance to receive a quality education that incorporates interdisciplinary systems competencies. It is, of course, an ambitious goal, and one that will certainly not be achieved easily – not without a great amount of time, effort, and support, especially with regards to raising interest and awareness about the interdisciplinary relevance of systems competencies and their role in education. SySTEAM has consequently made it a major objective to help build that community of support for systems competency awareness, both through building the SySTEAM community and by forging connections with other groups inside and outside of INCOSE.

This mini-conference represents a major step towards fulfilling SySTEAM's objective of establishing an international and interdisciplinary community of advocates for better systems competency education. The 2023 mini-conference will be bringing together participants from six continents, over 30 countries, and across 19 time-zones, and includes individuals from all parts of the STEAM career pipeline, ranging from students embarking on the start of their professional journeys to seasoned industry veterans. The mini-conference audience also includes educators, practitioners, and innovators from across the STEAM community, including arts & humanities experts and STEM specialists alike – all united by a common interest in systems education.

SySTEAM aims to have this inaugural mini-conference be the first in a continuing series of free and open-access events highlighting ideas from across the international and interdisciplinary community. It is hoped that these events will help foster further interaction and collaboration among systems-minded individuals typically separated by circumstance – whether by geographical divides, the STEM/humanities divide, or other conditions – and will strengthen ties within the global systems education community.

It's a milestone moment, and one that SySTEAM looks forward to sharing with all of you.

On behalf of the SySTEAM Initiative, best wishes for an enjoyable, engaging, and enlightening mini-conference experience. I look forward to seeing you all (virtually) at the mini-conference on July 27th and 28th, and online on the SySTEAM Discord community hub.

Warm regards,

Caitlyn A. K. Singam

SySTEAM Program Director

Key links & information

Conference access & materials

See the Participation Information section of this packet for additional details.

Zoom links

- **Day 1:** <https://bit.ly/470TH65>
- **Day 2:** <https://bit.ly/475fjOM>

SySTEAM Discord server

- **Sign-up/registration:** <https://bit.ly/3NVLwjV>
- **Access for registered users:** <https://bit.ly/3XxCVqI>

YouTube livestream

- **Day 1:** <bit.ly/3pnX9H7>
- **Day 2:** <bit.ly/3JBiNy7>

Contact and additional information

SySTEAM Initiative

SySTEAM is a volunteer-run INCOSE initiative. Participation in SySTEAM is completely free for all interested individuals; INCOSE membership is encouraged but not required in order to be considered a full SySTEAM community member.

- **Primary contact:** Caitlyn Singam, SySTEAM Program Director
 - **Email:** Caitlyn.Singam@incose.net
 - **Via the SySTEAM Discord server:** @csingam or @Moderator
- **Main page:** <https://www.incose.org/system>
 - **Join SySTEAM:** <https://www.incose.org/system#join>
 - **Community meetings:** <https://bit.ly/3B8Waf7>
 - Bimonthly on Thursdays, 10AM to noon Eastern Time; see SySTEAM webpage for details and scheduling

International Council on Systems Engineering (INCOSE)

Major SySTEAM announcements frequently appear on the webpages linked below.

- **Main page:** incose.org
- **Social media pages:**
 - **Twitter:** https://twitter.com/incose_org (@incose_org)
 - **Facebook:** <https://www.facebook.com/INCOSE/>
 - **LinkedIn:** <https://www.linkedin.com/company/incose>

Agenda

Day 1: Thursday, July 27th, 2023

All times are listed in Eastern Time. Please be mindful of any time-zone differences when planning your attendance/participation.

ID	Item description	Speakers (marked in bold)	Type	Start	End	Duration (hrs)
1	Day 1			11:00 AM	4:00 PM	5:00
1.1	Welcome & overview			11:00 AM	11:20 AM	0:20
1.1.1	Opening remarks	SySTEAM	Admin	11:00 AM	11:05 AM	0:05
1.1.2	Conference logistics & FAQ	SySTEAM	Admin	11:05 AM	11:20 AM	0:15
1.2	SySTEAM overview			11:20 AM	11:45 AM	0:25
1.2.2	Overview of SySTEAM Initiative	SySTEAM	Admin	11:20 AM	11:45 AM	0:25
1.3	Session 1: Current trends & practices			11:45 AM	12:45 PM	1:00
1.3.1	Systems engineering education shortfalls with respect to INCOSE 2035	Robin R. Rose	Paper	11:45 AM	12:15 PM	0:30
1.3.2	Growing your own systems engineer	David Ward, A. Abadessa	Paper	12:15 PM	12:45 PM	0:30
1.4	Workshop 1: Current state of systems education			12:45 PM	1:10PM	0:25
1.4.1	Workshop logistics	SySTEAM	Admin	12:45 PM	12:50 PM	0:05
1.4.2	Workshop discussion	Attendees	Group	12:50 PM	1:10PM	0:20
1.5	Lunch break/networking			1:10PM	1:40 PM	0:30
1.6	Session 2: Emerging techniques & priorities			1:40 PM	3:50 PM	2:10
1.6.1	Using A3 Architecture Overviews as an educational tool	Steven P. Haveman , B. Steenhuisen, M. G. Bonnema	Paper	1:40 PM	2:10 PM	0:30
1.6.2	Engaging young learners in systems engineering education through gamified learning: introducing Lil Sys	Matthew Frisbee , R. den Dulk, C. McCoy, K. Corl	Poster	2:10 PM	2:20 PM	0:10
1.6.3	Bringing back Humanity in a tech-driven world: (re)incorporating the arts into engineering curricula to make STEAM reality and enhance disciplinary convergence	Rock Mendenhall , Steven Simske , P. V. Knaus	Paper	2:20 PM	2:50 PM	0:30
1.6.4	A time constrained integration of systems thinking into generic engineering degrees: a case study from New Zealand working towards Washington Accord Accreditation	Nick Pickering	Paper	2:50 PM	3:20 PM	0:30
1.6.5	Fumbling towards net-zero carbon policies: using simulation to improve the systems thinking principles	Chris A. Browne	Paper	3:20 PM	3:50 PM	0:30
1.7	Day 1 closeout			3:50 PM	4:00 PM	0:10
1.7.1	Closing remarks	SySTEAM	Admin	3:50 PM	3:55 PM	0:05
1.7.2	Adjournment / networking opportunity (optional)	Attendees		3:55 PM	4:00 PM	0:05

Agenda

Day 2: Friday, July 28th, 2023

All times are listed in Eastern Time. Please be mindful of any time-zone differences when planning your attendance/participation.

ID	Item description	Speakers (marked in bold)	Type	Start	End	Duration (hrs)
2	Day 2			9:00 AM	1:00 PM	4:00
2.1	Welcome & overview			9:00 AM	9:05 AM	0:05
2.1.1	Recap & overview	SySTEAM	Admin	9:00 AM	9:05 AM	0:05
2.2	Session 3: Bridging education and experience	-		9:05 AM	10:45 AM	1:40
2.2.1	Proposal of a method to foster systems thinking using visual thinking strategies	Akihiro Kitahara, M. Ioki	Poster	9:05 AM	9:15 AM	0:10
2.2.2	Integrating system safety engineering into STEM education	Christopher Green	Paper	9:15 AM	9:45 AM	0:30
2.2.3	For the journey to expertise in systems engineering, enhance the path with Shu Ha Ri	Fred Robinson	Paper	9:45 AM	10:15 AM	0:30
2.2.4	Human systems integration: from STEM to STEAM	Guy André Boy	Paper	10:15 AM	10:45 AM	0:30
2.3	Workshop 2: Future trends in STEAM and STEM education			10:45 AM	11:05 AM	0:20
2.3.1	Workshop discussion	Attendees	Group	10:45 AM	11:05 AM	0:20
2.4	Break			11:05 AM	11:15 AM	0:10
2.5	Session 4: Pedagogy in practice (case studies)			11:15 AM	12:45 PM	1:30
2.5.1	Systems thinking in emergent behavior analysis summer internships	Kristin Giammarco, M. Collins, J. James, M. Novitzky	Paper	11:15 AM	11:45 AM	0:30
2.5.2	Azusa Pacific University CubeSat program	James D. Johansen	Poster	11:45 AM	11:55 AM	0:10
2.5.3	Safety third: a case study for a project-based approach to systems engineering education	Chris Brown	Poster	11:55 AM	12:05 PM	0:10
2.6	Closing	-		12:05 PM	1:00 PM	0:55
2.6.1	Closing remarks	SySTEAM	Admin	12:05 PM	12:30 PM	0:25
2.6.2	Adjournment / networking opportunity (optional)	Attendees		12:30 PM	1:00 PM	0:30

Conference information

Summary and objectives

Overview

The inaugural INCOSE SySTEAM mini-conference is a free, two-day online event intended to provide individuals from around the globe with the opportunity to convene, discuss, and exchange ideas relating to the intersection between systems STEM/STEAM education and systems competencies through a combination of contributed talks/papers/posters and roundtable discourse among attendees.

Objective

The aim of the event is to provide an opportunity for SySTEAM community members and other systems-minded individuals from around the globe to take center stage in sharing, discussing, and showcasing ideas and work relevant to SySTEAM's interests. Attendees are invited to interact and collaborate with their colleagues from around the world in characterizing, contemplating, and challenging the existing and emerging ideas in the realm of systems competency education, in furtherance of SySTEAM's long-term goal of "improving education for all students, everywhere".

Audience

SySTEAM takes pride in its vibrant and variegated international community, the diversity of which is reflected in our mini-conference audience.

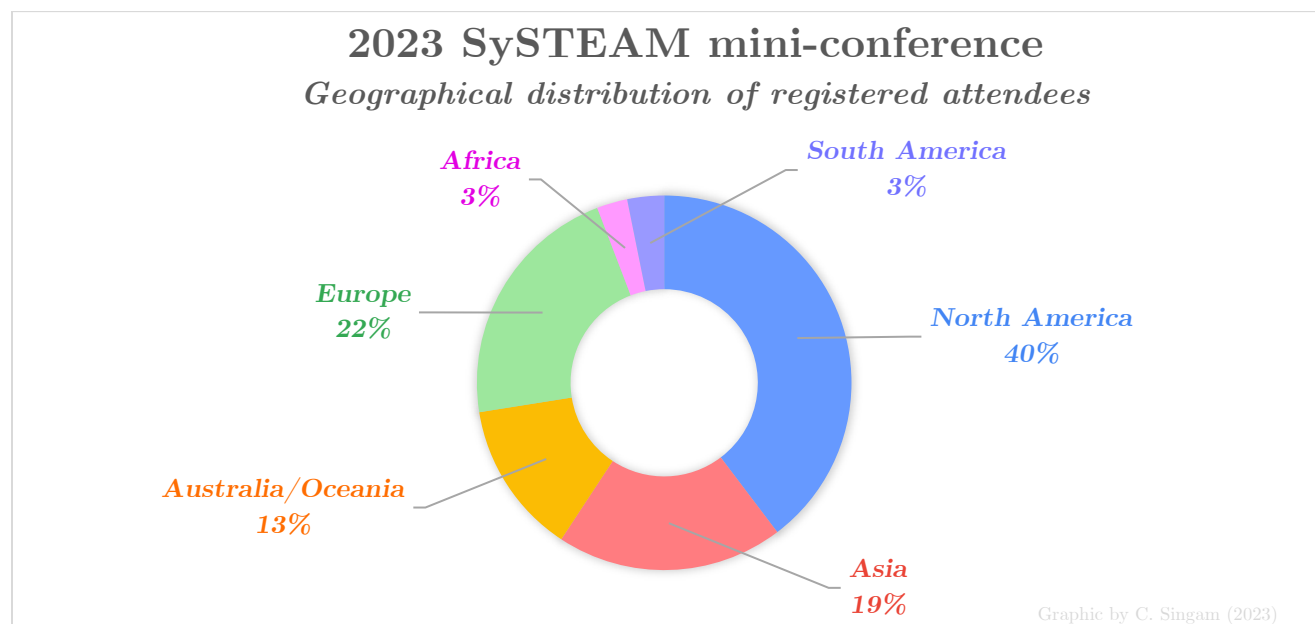


Figure 1. Geographical distribution of 2023 mini-conference attendees.

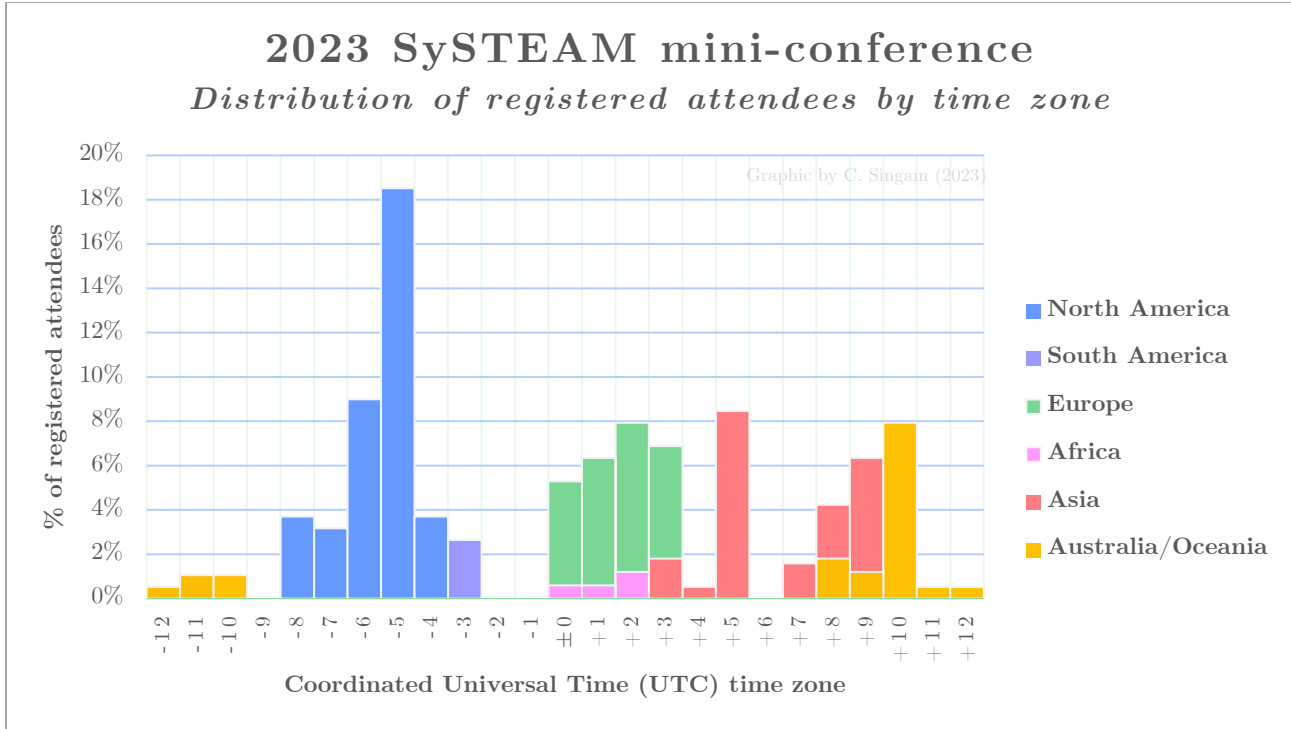


Figure 2. Distribution of 2023 SySTEAM mini-conference attendees by UTC time zone.

2023 SySTEAM mini-conference

Attendee specialties by sector

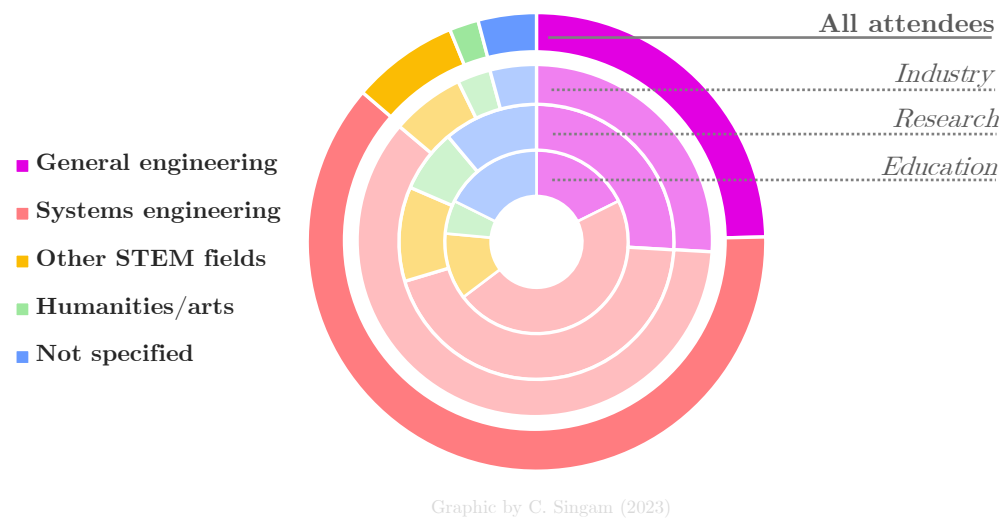


Figure 3. Mini-conference attendees specialties/areas of expertise, broken down by sector. Each sector is represented by a different ring, as noted by the labels on the right, while each area of specialty is represented by a different color (as indicated by the key on the left).

Participation information

The SySTEAM mini-conference is a fully virtual event that is open to all members of the public. We are delighted to have attendees participating from around the world, with over 200 registered audience members joining us from across six continents and 34 different countries. While the logistical challenge of making real-time and near-real-time participation feasible for audience members joining in from a variety of time zones is not a trivial one (we have 21 of the 25 main Coordinated Universal Time (UTC) time zones represented amongst our registered audience members), SySTEAM has aimed to make this event accessible to as wide an audience as possible by offering multiple means for attendees to participate. All of the options listed below are accessible at no cost to participants.

Join via Zoom

- **Link** [*sign-up required two days in advance*]: bit.ly/43aD71v

The best way to participate in the mini-conference is by joining us live on Zoom during the times listed on the mini-conference program (please see the agenda included in this packet). In addition to being able to watch the mini-conference's technical presentations in real time, participants on Zoom will be able to join in on roundtable discussions, contribute ideas during workshop sessions, ask questions during question & answer (Q&A) sessions with mini-conference speakers, and network with their fellow attendees during breaks. Mini-conference attendees are not required to have their cameras and microphones on while participating via Zoom, though microphone access is strongly recommended for individuals interested in participating in group discussions during the workshop sessions. Please note that the mini-conference presentations and associated Q&A sessions will be recorded & livestreamed; parts of the conference held in Zoom breakout rooms, including networking sessions (held during breaks) and some workshop discussions (where participants are split up into small groups) may not be recorded due to limitations of the Zoom platform.

Individuals participating via Zoom may wish to also participate in discussion on the SySTEAM Discord (see details below) for a more complete mini-conference experience.

Watch on YouTube

- **Links** [*no sign-up required*]: bit.ly/3pnX9H7 (Day 1), bit.ly/3JBiNy7 (Day 2)

The mini-conference will also be viewable on YouTube. Individuals who wish to follow the event on YouTube can watch the conference in real time via a livestream, or can alternatively view the recordings at a later time. Livestream viewers may wish to note that there may be up to a 20-second delay between the Zoom feed and the YouTube stream. Please note that parts of the conference held in Zoom breakout rooms, including networking sessions (held during breaks) and some workshop discussions (where participants are split up into small groups) may not be livestreamed due to technical limitations; individuals wishing to interact in real time with the

mini-conference speakers or their fellow attendees are encouraged to participate directly via Zoom instead. Individuals watching the livestream may wish to also participate in discussion on the SySTEAM Discord (see details below) for a more complete mini-conference experience.

The YouTube livestreams from both days of the event will remain available on YouTube after the end of the mini-conference for individuals who wish to view them later and/or are unable to participate live due to schedule conflicts.

Participate via Discord

- **Link:** bit.ly/3NVLwjV [sign-up/registration], bit.ly/3XxCVqI [registered users]

Individuals wishing to participate in mini-conference discussion asynchronously may do so via the SySTEAM community Discord. For a few days leading up to the mini-conference, and during the mini-conference itself, the Discord will have a dedicated section for associated discussion, which will include the following mini-conference specific channels:

- **#atrium:** a general space for mini-conference attendees to interact.
- **#discussion:** a dedicated channel for posting questions for our conference speakers and for generally discussing ideas & content directly related to the conference.
- **#networking:** a place for conference attendees to introduce themselves and to network with each other asynchronously (in supplement to the networking opportunities included in the main conference program).
- **#conference-info:** a read-only channel for conference announcements, logistical information, and materials.

Additional accessibility options

- **Dial-in (audio only) participation in the live mini-conference:** participants with limited internet access or without access to a microphone/speaker may wish to dial-in via phone in order to get audio-only access to the live conference. Dial-in access can be used in conjunction with, or independently from, video access to the meeting via the Zoom link or the YouTube livestream. Dial-in information is provided in the Zoom invitation emails sent out to participants before the conference, alongside the information for standard Zoom participation over the web.
- **Automated captions/transcripts:** automated captions are available for participants attending the live conference via Zoom. Please note that background noise and other factors may affect the quality of the captions.
- **Text-based Q&A:** participants who do not have microphone access, or who otherwise are not able to/do not wish to ask questions verbally, have the option to type their questions for the conference presenters.

Selection process for papers & posters

Selection process

The 2023 mini-conference includes a substantial amount of contributed content in both poster and paper format. Content for the 2023 SySTEAM mini-conference was selected based on a double-blind peer review process. Each submission was peer reviewed by 2-3 independent peer reviewers, who were matched with each submission based on their relevant expertise/knowledge. In the interest of fairness, SySTEAM utilized a double-blind review process, and kept all submissions and reviewers anonymous during the review process. (References to an author's home institution and other pieces of identifying information were redacted from all submissions prior to being sent out for review). Selection decisions were made based on both (1) the scores reviewers gave each submission, and (2) any written reviewer feedback.

Scoring rubric

Peer reviewers were asked to score submitted content on a scale of 1-5 relative to the following criteria:

- **Scope:** alignment with conference objectives
- **Significance/originality:** impact on the field of systems education and novelty compared to pre-existing academic literature on the same subject
- **Technical merit:** quality of argument and/or evidence supporting the author(s)' conclusions
- **Clarity/organization:** clarity of the author(s)' intended objectives and of the method(s)/approach used to substantiate those objectives
- **Readability:** accessibility of the material to an interdisciplinary audience (minimal use of domain-specific jargon, and grammatical correctness).

A summary of the reviewers' scores and comments, along with editorial remarks from the conference organizer, were sent to each abstract's corresponding author along with SySTEAM's acceptance/rejection decision.

Results

The short format of this year's event (hence the "mini" in "mini-conference") meant that a substantial number of intriguing abstracts could not be included in this year's program, or were only included in a shortened (10-minute rather than 30-minute) format, due to the limited number of available presentation slots. Authors whose content was not selected for inclusion in the mini-conference have been encouraged to consider using the reviewer feedback they received to revise their content for submission to a future SySTEAM event or another unaffiliated (non-SySTEAM) forum.

About SySTEAM

Overview

History

Founded in 2021, the INCOSE SySTEAM Initiative is a volunteer-run international community striving to promote greater integration of interdisciplinary systems thinking and systems engineering competencies in education. The 2023 mini-conference is the first in a planned series of regular conferences organized by SySTEAM, and is intended to serve as an opportunity for members of the SySTEAM community and the public to network with each other and share their ideas, thoughts, and projects.

Embracing STEAM

SySTEAM's community includes a wide diversity of participants from different academic, geographic, and personal backgrounds, and on being a truly interdisciplinary group that includes members of the arts and humanities alongside those from traditional STEM fields. It is SySTEAM's belief that students in every field can benefit from the interdisciplinary systems thinking/systems engineering skills that SySTEAM seeks to promote, and that every student, no matter where in the world they live or what career they want to pursue, has a fundamental right to a quality education that teaches those skills.

In recognition of its commitment to interdisciplinary collaboration, the SySTEAM community officially changed its name from "SySTEM" (the name it was initially launched under) to the "SySTEAM" name it uses today. By including the 'A' in as part of its name, SySTEAM wishes to recognize that the arts and humanities – the 'A' in STEAM – are just as much a part of SySTEAM's vision as STEM fields are, and that the contributions that the arts and humanities offer to STEM fields and vice versa are equally worth celebrating.

Mission & vision

SySTEAM is founded on the belief that systems thinking (ST) and systems engineering (SE) skills are, by virtue of being interdisciplinary, are of widespread significance in education and can help students develop competencies that are relevant to careers inside and outside of the SE practitioner community. To that end, SySTEAM strives to promote the integration of ST/SE skills into STEAM educational curricula across the globe, at all levels of education (from primary school to post-graduate education/professional development). SySTEAM is also committed to helping promote more just, equitable, and transparent approaches to education, and thus aims to champion the integration and enhancement of ST/SE into STEAM education in such a manner that helps reduce disparities in educational quality, access, and competency attainment.

The SySTEAM vision is to improve the quality of STEAM education worldwide, for all students, by changing the way in which educators, administrators, and other relevant stakeholders place value on and leverage ST/SE skills, and by establishing a community to advocate for holistic integration of ST and SE principles and skills (inclusive of the skills represented in the INCOSE Competency Framework) into existing STEAM curricula and programs. SySTEAM believes that a solid and robust level of competency in interdisciplinary ST/SE skills is necessary to ensure that today's youth are able to successfully operate in the workplace and as global citizens, and wants to ensure that every student has the opportunity to develop those skills during their educational journey.

Core values

There are several key values which are intrinsic to the SySTEAM mission, and which inform the strategic approaches SySTEAM uses in support of its aforementioned mission and vision.

Accessibility and transparency

SySTEAM believes that all individuals should have the right to a quality education which provides them with the knowledge, skills, and competencies needed for success in the modern globalized workforce, regardless of their personal background, geographical location, professional affiliation(s), or field(s) of interest. SySTEAM therefore is committed to ensuring that its work is accessible, applicable, and implementable by individuals inside and outside the systems engineering community, and that its completed work products are available online at no cost to the public.

Inclusivity and accountability

SySTEAM strives to ensure the representation of the common interests and perspectives of all its stakeholder groups through its participants and community members. SySTEAM notes that imbalances and differences in various educational systems currently result in different stakeholder groups with common educational needs being nonetheless disproportionately over- or under-represented in receiving access to SE/ST competency training and quality STEM education, compared to what may be expected from the composition of the general population; SySTEAM consequently aims to combat this issue through its activity by including participants from a wide variety of backgrounds, actively identifying and addressing areas of variability in STEAM educational pathways, and developing products which have relevance to, and can be implemented by, the widest possible set of stakeholders.

Quality and action-driven performance

SySTEAM aims to establish recommendations and products that are designed to be of long-term use and sustainable to the greatest extent possible. SySTEAM thus prioritizes the identification of obstacles to implementation so that they can be addressed accordingly, and also aims to continuously improve its work products with the help of the international SySTEAM community.

Integrity and ethical conduct

SySTEAM and its members abide by ethical standards for engineering professional conduct. The INCOSE Code of Ethics represents a minimum standard of ethical behavior according to which all SySTEAM members are required to conduct themselves. SySTEAM has also established its own supplementary code of conduct for events under the SySTEAM umbrella.

Aims and current efforts

Summary

SySTEAM is working towards generating recommendations and resources regarding STEAM education that balance the needs of students, prospective/current employees, employers, etc., in order to maximize educational equity and excellence in SE in a manner that benefits all of SySTEAM's stakeholder groups (students, educators, industry, etc.). Individuals from the general public are more than welcome to join SySTEAM as community members, and are similarly encouraged to provide input to SySTEAM's framework development efforts if they so desire; the SySTEAM inclusivity policy means that any and all interested individuals are welcome to join the SySTEAM community, and that all input is given equal consideration at SySTEAM meetings, etc.

Objectives and goals

SySTEAM's primary strategic objective is to facilitate achievement of its vision of improving education for all students, everywhere, through a combination of community engagement/advocacy efforts and the development of implementable recommendations, guidelines, and resources.

SySTEAM strives to achieve the following goals in support of that objective:

- (1) increasing awareness of, and interest in, SE as a discipline (with an end goal of facilitating increased recruitment and retention of SE talent);
- (2) increasing community attainment of the interdisciplinary knowledge & skillsets needed for success in the SE workforce in particular, and in the global STEAM workforce in general, through the integration of ST/SE competencies into education & training programs; and
- (3) mobilizing existing members of the SE community as advocates for interdisciplinary ST and SE education in their respective regions/communities.

Current progress

SySTEAM's main deliverable - a framework for integrating SE and systems thinking concepts and competencies into all levels of STEAM education, from primary education to post-graduate

and on-the-job (OTJ) training - primarily addresses goals (1) and (2) above by providing educators and other stakeholders in the sphere of STEAM education with actionable recommendations that they can use to introduce, integrate, and foster SE-relevant skills/knowledge earlier on in the talent development pipeline. SySTEAM is also addressing goal (1) by opening the SySTEAM community, the SySTEAM online community, and SySTEAM documentation to individuals outside immediate INCOSE community (including individuals from the arts and humanities) in addition to those already in INCOSE, in order to help increase awareness of systems thinking & similar skills as interdisciplinary competencies that can be readily integrated into a diversity of existing educational curricula and activities.

As part of its framework development efforts, SySTEAM has also been addressing goal (3) by holding regular open-access community meetings where existing issues of importance in STEAM education/advocacy are highlighted and discussed as a community. Through these discussions, SySTEAM is seeking to identify means of achieving goals (1) and (2) whilst also equipping its community members - many of whom engage in STEAM advocacy outside of SySTEAM - with the knowledge needed to effectively serve as ambassadors for the SySTEAM mission/vision in their workplaces/communities, as well as providing community members with a forum for discussing and sharing ideas related to outreach/advocacy, etc. Rather than directly organizing outreach events (school visits, etc.), SySTEAM's preferred approach is to empower community members and related groups to be the ones to coordinate such outreach efforts (with SySTEAM providing informal guidance where requested). SySTEAM thus aims to be a centralized hub/resource for establishing the foundational infrastructure for community development efforts, which can then be implemented by outreach efforts independently spearheaded by individuals and organizations, local chapters, and community groups who are better positioned to organize and promote grassroots endeavors in their domains/regions of interest.

Links & additional details

More information about SySTEAM is available on the SySTEAM webpage, on the SySTEAM Discord server, and in SySTEAM's articles in the INCOSE member newsletter.

SySTEAM webpage

- **Link:** incose.org/system

The SySTEAM webpage is the recommended starting point for newcomers to INCOSE and/or the SySTEAM Initiative. The webpage provides a condensed summary of SySTEAM's mission, vision, and current work, and is regularly updated with scheduling and logistical information about SySTEAM's community meetings and events.

SySTEAM Discord server

- **Link:** bit.ly/3NVLwjV [sign-up/registration], bit.ly/3XxCVqI [registered users]

The SySTEAM Discord server/community hub is an open discussion space for SySTEAM community members to interact and share interesting ideas, resources, and information. It also serves as a repository for SySTEAM's in-progress work and documentation (agendas, meeting minutes, slides, and more), and is generally the first place where SySTEAM files and announcements get posted & shared. The Discord server is also generally the best place to get reminders/updates about SySTEAM meetings and events. A dedicated section of the SySTEAM Discord has been opened for the purpose of hosting online discussion associated with the 2023 SySTEAM mini-conference.

INCOSE newsletter & impact statement

- **Link:** incose.org/products-and-publications/periodicals/newsletters
- **Link:** incose.org/impact [impact statement]

SySTEAM frequently shares major progress updates and plans through the quarterly INCOSE Member Newsletter and the annual INCOSE Impact Statement. Both documents are accessible to non-INCOSE members via the INCOSE webpage, and are also emailed directly to INCOSE members.

Links to SySTEAM's previous appearances in the INCOSE Impact Statement and INCOSE Member Newsletter are linked below. has previously published updates in the 2022 INCOSE Mid-Year Impact Statement, the 2023 INCOSE Impact Statement (pg. 5), and in the following editions of the INCOSE Member Newsletter:

- **2022 Quarter 1 newsletter:** introducing the Initiative (pgs. 19-21)
 - **Link:** <https://bit.ly/3CWBD8b>
- **2022 Quarter 2 newsletter:** the importance of STEAM (pgs. 19-20)
 - **Link:** <https://bit.ly/3mTeEtI>
- **2022 Mid-Year Impact Statement** (pg. 8)
 - **Link:** <https://bit.ly/3Y4Nwdf>
- **2022 Quarter 4:** SySTEAM end-of-year review and retrospective (pgs. 20-21)
 - **Link:** <https://bit.ly/3VbPQMd>
- **2023 Impact Statement** (pg. 5)
 - **Link:** <https://bit.ly/3KfYLD7>
- **2023 Quarter 1 newsletter:** plans for 2023 / introducing the mini-conference (pgs. 60-61)
 - **Link:** <https://bit.ly/3UaR3Ve>
- **2023 Quarter 2 newsletter:** SySTEAM mini-conference announcement (pg. 47)
 - **Link:** <https://bit.ly/3q4Rc1X>

SySTEAM code of conduct

Overview

Scope and purpose

The INCOSE SySTEAM Initiative is comprised of an international community of volunteers from a variety of different personal, academic, geographic, and professional backgrounds, and is committed to ensure that attendees at SySTEAM events and members of the SySTEAM community are able to share and discuss their ideas with others in an inclusive, safe, and welcoming environment. All attendees, speakers, and participants at the SySTEAM mini-conference are required to abide with the following code of conduct, which will be enforced throughout the event.

The requirements stipulated below are adapted from the principles set forth in the Model Code of Conduct promulgated by the United Nations (<https://bit.ly/43C0EYk>), with modifications made to suit the needs and practices of the SySTEAM Initiative.

SySTEAM is an INCOSE initiative, and as such abides by all applicable INCOSE policies and bylaws. This code of conduct supplements (i.e., adds on to) the requirements set forth in the INCOSE Code of Ethics (<https://bit.ly/450wE9H>), and should not be considered a replacement or waiver for any obligations specified under the INCOSE Code of Ethics.

Applicability

All members of the SySTEAM community and participants in SySTEAM events must abide by the INCOSE Code of Ethics (as posted on the INCOSE website), regardless of whether or not they are INCOSE members. The SySTEAM Code of Conduct applies to members of the SySTEAM community whilst acting in affiliation with, or on behalf of, the SySTEAM Initiative, and extends to attendees and participants in SySTEAM-organized events as well as to online activity using, or otherwise facilitated by, a SySTEAM-run platform (including, but not limited to, the SySTEAM community Discord). In any instance there is a contradiction between the SySTEAM Code of Conduct and another applicable policy (e.g. the INCOSE Code of Ethics), the higher standard of the two (i.e., the more restrictive rule) applies.

Plain-language summary

Members of the SySTEAM community and attendees at SySTEAM events are expected to conduct themselves in a professional and ethical manner, and to interact with their colleagues, fellow community members, and all members of the public in a respectful and cordial manner. Harassment or discrimination of any kind is not tolerated.

Prohibited conduct

General guidelines

Generally, conducting oneself in a manner that would be considered appropriate at a formal workplace should be more than sufficient to ensure compliance with the Code of Conduct. Nonetheless, should there be any doubt as to whether certain behavior does or does not violate the rules set forth herein, individuals are strongly urged to err on the side of caution. A good rule of thumb is to refrain from engaging in conduct or using language that would be considered inappropriate in an academic environment where there are pre-collegiate students in attendance (e.g. a secondary school), and to keep discussions on-topic (or at least SySTEAM-relevant) when using SySTEAM-run platforms or attending SySTEAM events. SySTEAM events and platforms are open to all members of the public, including students, and are not age-restricted; as such, individuals participating in SySTEAM events or using SySTEAM platforms are encouraged to conduct themselves in a manner that is appropriate for a mixed audience of students, educators, and industry professionals from around the globe.

Inflammatory language

While differences of opinion are a typical (and indeed, often necessary) part of academic/intellectual discussion, it is expected that all discourse (both verbal and written) at SySTEAM events or on SySTEAM platforms remains civil and professional. This means that the use of inflammatory language (e.g., *ad hominem* attacks), profanity, name-calling, or slurs is strictly prohibited along with lewd or suggestive material. Similarly, threats of violence, or expressions conveying a wish for harm to befall an individual or group are also strictly prohibited under any and all circumstances. There are no exceptions for inflammatory language claimed to be used ironically or in jest.

Discrimination

SySTEAM has a zero-tolerance policy towards discrimination. Behaviors, gestures or remarks that disparage or are otherwise targeted against a group or class of individuals (or a member of that group or class) based on their demographics or personal characteristics are explicitly prohibited. This stipulation applies to, but is not limited to, behaviors, gestures, and remarks based on: race/ethnicity, skin color, physical features, religion, sex, sexual orientation, gender identity or expression, national origin, disability, age, pregnancy, or veteran status. Confirmed instances of discriminatory behavior are grounds for temporarily or permanently suspending an offending individual's access to the SySTEAM platform or event they are using to enact their discriminatory conduct.

This does not limit discussion of demographic characteristics in general, especially since SySTEAM-relevant discussion of disparities in systems education may benefit from discussing

how factors such as gender or race impact individuals' experiences progressing through the STEAM educational pathway. It does, however, prohibit conduct and language that is offensive, hostile, derogatory, and/or exclusionary.

Harassment

SySTEAM also takes a zero-tolerance approach to harassment. SySTEAM uses the definition of harassment from the United Nations' Model Code of Conduct, which states that “[h]arassment is any improper or unwelcome conduct that might reasonably be expected or be perceived to cause offence or humiliation to another person”. This includes, but is not limited to, threatening, derogatory or demeaning behavior/conduct against an individual or group of individuals, including but not limited to derogatory jokes, comments, pictures, gestures, and/or verbal, electronic, or written messages conveying hostile, humiliating, or offensive content. Repeated conduct or statements towards a person or group that are unwanted and/or unwarranted, and that an individual or group continues to repeat despite being told to stop, also constitute harassment, regardless of whether that unwanted conduct is via visual, verbal, or physical means. Other prohibited conduct includes, but is not limited to, the following:

- Stalking - i.e., repeatedly following an individual in an unwanted and unwarranted manner, or threatening manner via online platforms and/or in person – or using SySTEAM events and/or platforms to facilitate such behavior (e.g., obtaining a person's Discord username via the SySTEAM Discord server to repeatedly send them unwanted messages);
- Sexual harassment and all communications, requests, or demands, of a romantic or sexual nature, including but not limited to lewd, obscene, or suggestive imagery, messages, comments, or conduct;
- Coercion, including offering an individual or group potential or actual favor(s) of a professional or personal nature in return for an “off-the-record” exchange of money, goods, or services;
- Verbal or written communication that has the purpose or effect of unreasonably and negatively interfering with the employment, potential employment, reputation, safety, or freedom of an individual or group of individuals, as well as actions with the same effect as such communication, such as filing a false incident report with SySTEAM; and/or
- Isolated threats against individual(s) or their property, regardless of whether the individual(s) or group(s) making the threat(s) are able to act on the threat(s), are considered harassment as well, even if they are not repeated.

Confirmed instances of harassment are grounds for temporarily or permanently suspending an offending individual's access to the SySTEAM platform or event they are using to enact their harassing conduct, and may be grounds for expulsion from all present and future SySTEAM activities.

Illegal activity

It should be inherently obvious that illegal activity is blatantly and completely prohibited at SySTEAM events and on SySTEAM platforms, and is grounds for immediate and permanent expulsion from a SySTEAM event/platform. It is the exclusively the responsibility of individual SySTEAM community members/event participants to ensure that they are abiding by the appropriate laws and regulations that apply to them and their jurisdiction.

Spam and misuse of SySTEAM resources

In order to ensure that SySTEAM events and SySTEAM-run platforms can be optimally used for their intended purposes, use of SySTEAM events or SySTEAM-run platforms for the purposes of engaging in financial transactions/sales or business promotion of a company and/or product is generally prohibited. This prohibition also extends to using SySTEAM events or platforms to collect personal or contact information (e.g. email addresses or Discord handles) of individual(s) for non-SySTEAM purposes (e.g. marketing or mass-adding to one's social media) without their direct consent. The intent of this stipulation is to prevent misuse of SySTEAM resources, and to ensure that individuals feel safe engaging with SySTEAM events and/or platforms without putting their personal information at risk. There are very limited exceptions to the prohibition on promotional messaging, such as mentioning an employer(s) while introducing oneself, or when discussing a SySTEAM-related business product with other individuals in designated networking space(s) provided by SySTEAM. Barring those exceptions, it is generally expected that individuals should aim to keep their discussions SySTEAM-relevant and on-topic while using SySTEAM-run platforms or while at SySTEAM events. Individuals are encouraged to use non-SySTEAM resources and platforms such as their own personal social media and email for their promotional needs or for continuing off-topic discussions that might arise during SySTEAM meetings or at SySTEAM platforms.

Accountability

Individuals are responsible for ensuring that their conduct meets the requirements set forth in the SySTEAM Code of Conduct and INCOSE Code of Ethics. Minor infractions (e.g. an isolated incident of disruptive but non-harassing behavior during a meeting) may be handled informally through the issuance of verbal or written requests to the concerned individual asking for them to stop the offending behavior, if SySTEAM has a reasonable belief that addressing the issue informally will result in the fastest means of fully addressing the issue. Individuals who receive a verbal or written request from a SySTEAM event organizer or platform manager asking them to refrain from or to stop engaging in problematic behavior are expected to comply immediately. SySTEAM retains the right to take action without warning in the case of suitably severe infractions, such as (but not necessarily limited to) incidents of harassment or threats of violence. As addressed in the "Incident Reporting" section below, any behavior or conduct not consistent with the requirements set forth in the SySTEAM Code of Conduct and/or INCOSE

Code of Ethics may impact the ability of the associated individual(s) (i.e., the individual(s) or group(s) engaging in improper conduct) to participate in the SySTEAM community, attend present or future SySTEAM events, and/or use SySTEAM-run platforms such as the SySTEAM Discord server.

Incident reporting

How to report an incident

If, while at a SySTEAM event, or while using a SySTEAM-run platform, you are involved with or witness an incident that violates the SySTEAM Code of Conduct or the INCOSE Code of Ethics, please contact the event organizer or platform administrator immediately with a detailed description of the incident and any supporting documentation/information (screenshots of messages, names/contact of other individuals who may have seen the problematic conduct, etc.) that you might have to corroborate your report. Please be as detailed as possible when filing a report so that SySTEAM can investigate the incident thoroughly and take appropriate action. Incident reports may be filed via email or via the following incident report form: <https://forms.gle/zxGCSN7Z16xju8Mk6>. All reports will be investigated based on available evidence.

Inquiry process

SySTEAM will investigate all reports of misconduct under its purview to the best of its ability. If the investigation indicates that an infraction of the Code of Conduct/Code of Ethics occurred, SySTEAM reserves the right to take action at its discretion against the individual(s) who violated the Code of Conduct/Code of Ethics, with the severity of the offense generally being tied to the severity of the resulting intervening action. These actions may include, but are not necessarily limited to, short-term, reversible consequences for minor offenses (e.g., muting a participant's microphone during a web-conference meeting, in the case of a noisy/disruptive participant), as well as permanent consequences (e.g., removal of an individual from a SySTEAM event or, in particularly egregious cases, banning them from the SySTEAM community in the case of harassment or illegal activity). Given reasonable cause, SySTEAM reserves the right to take immediate, reversible preliminary steps in response to an incident (e.g., temporarily removing an offending party from a meeting in a suspected case of harassing behavior) while an incident is being investigated, particularly if it needs to do so in order to guarantee the immediate safety of SySTEAM community members, SySTEAM event attendees, and/or the general public. SySTEAM also retains the right to escalate an incident report to relevant authorities if appropriate or if otherwise required to do so by applicable law or regulation.

Additional information

Credits

The following individuals/groups were involved in making this year's mini-conference possible:

- *Mini-conference concept/development, organization, & materials* by C. Singam
- *Posters and papers* by contributing authors*
- *Technical reviews of contributed content* provided by volunteer peer reviewers*
- *Social media support* provided by the INCOSE Marketing and Communications team
- *Video conferencing software (Zoom) access* provided by INCOSE
- *Web hosting for the SySTEAM Initiative webpage* provided through INCOSE

* - see *Special Thanks* section below for a full list of names

Notices and disclaimers

Recording notice

The 2023 SySTEAM mini-conference is a recorded online event, which will be simultaneously be broadcast to the public via YouTube livestream. The YouTube recording of the mini-conference will remain available to the public after the conclusion of the mini-conference. Participants who do not wish to be included in the recording must ensure that they have their cameras and/or microphones disabled accordingly during the live mini-conference. Participants are responsible for ensuring that any content they share during the mini-conference is in alignment with both the INCOSE Code of Ethics and the SySTEAM Code of Conduct, and is suitable for distribution in a public forum. Participants should not share private, confidential, proprietary, classified, or restricted-access information unless they are certain it is appropriate and permitted for them to do so.

Copyright notice

All pre-prepared material presented during the conference (including papers, posters, and slide decks) is considered to be under the copyright of the associated author(s), except where noted, and is being distributed as part of the free SySTEAM mini-conference materials with permission from the author(s), to conference attendees and the general public by SySTEAM under a non-exclusive distribution agreement, at no cost to SySTEAM, INCOSE, the conference organizer, mini-conference attendees, or other associated parties. Individuals or organizations wishing to reproduce or adapt content from this mini-conference must seek and receive explicit permission from the associated content author(s) prior to re-using, reproducing, or adapting copyrighted content. Content shared by mini-conference participants during the live conference (e.g. written or verbal contributions during workshops) is considered to be contributed under a Creative

Commons CC BY-NC-SA (Attribution Non-Commercial Share Alike) license, which grants others the right to adapt the work on a non-commercial basis so long as they credit the original author(s) and license their work under identical terms. (This is the same license used for content contributed during SySTEAM community meetings). By participating in the 2023 SySTEAM mini-conference workshops, participants agree to make their work available under this license.

Financial disclosures

As part of its commitment to accessibility and transparency, SySTEAM is proud to offer this mini-conference as a free event that is open to any and all members of the public at no cost. The conference organizer, presenters, authors, and peer reviewers associated with this mini-conference are all volunteers who contributed their time and effort to contribute to this conference without financial compensation from SySTEAM or INCOSE. As such, apart from its affiliation with INCOSE, SySTEAM has no financial ties to disclose. Contributing authors/presenters whose contributions (papers/posters) were developed within the scope of their employment have indicated their affiliation(s) on their slide decks and papers.

Disclaimer on contributed content

This event features papers, posters, and presentations contributed by various authors, whose work was selected for inclusion in the mini-conference program on the basis of relevance and potential interest to the SySTEAM community. This event also features workshop sessions where participants are provided the opportunity to express their opinions and ideas on various matters of interest to SySTEAM. The views expressed by these authors, presenters, and participants are their own and may or may not align with the views of INCOSE, the SySTEAM Initiative, or the conference organizer. Inclusion of any specific piece of contributed content (whether as part of the mini-conference proceedings (whether as scheduled content or an *ad hoc* contribution) or in subsequent recordings/publications stemming from the mini-conference should not be considered to be an endorsement of the contributor(s), their affiliated institution(s)/organization(s), or the views espoused by those parties, nor should it be considered an expression of approval or disapproval by INCOSE, SySTEAM, or the conference organizer towards any products or entities referenced by the contributing individual(s).

Special thanks & acknowledgments

The 2023 SySTEAM mini-conference was made possible thanks to the contributions and assistance of a number of individuals, ranging from INCOSE staff to volunteers from around the globe. **INCOSE SySTEAM would like acknowledge the individuals listed in the sections below for having helped make this mini-conference possible.**

Contributing authors & presenters

SySTEAM thanks the contributing authors whose papers and posters are featured at this mini-conference for sharing their ideas with our mini-conference audience (listed below in alphabetical order by last name). SySTEAM extends special thanks to those among our presenting authors/speakers who were willing to accept presentation timeslots that are outside normal working hours in their local time zones (indicated with asterisks: *), as their adaptability has allowed SySTEAM to not only accept content from a more diverse set of speakers but to also provide the mini-conference audience with the opportunity to interact with those speakers live.

Primary & presenting authors

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** - Indicates a presenter who accepted a timeslot outside normal working hours in their local time zone (later than 7PM or before 8AM local time). SySTEAM extends special thanks to these individuals for going above and beyond to contribute to this year's mini-conference.*

Volunteer peer reviewers

SySTEAM would also like to thank the volunteer peer reviewers who freely gave their time, effort, and expertise in assisting with reviewing the submitted content SySTEAM received for consideration. Their feedback and comments were a vital part of helping identify which abstracts to select for the conference's technical program, and in ensuring that accepted content made for a quality, engaging mini-conference program. SySTEAM specifically would like to thank the following individuals (listed in alphabetical order by last name on the next page), who were selected as peer reviewers and who completed one or more technical reviews:

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INCOSE organizational staff & team members

SySTEAM would like to thank the following members of INCOSE staff for their assistance:

The INCOSE Marketing & Communications (MarCom) Team, for their assistance in promoting this event on INCOSE's various online platforms and on social media, and in helping spread the word about this event to a broad audience of educators, students, and industry professionals from around the globe. SySTEAM extends special thanks to the following MarCom team members (listed in alphabetical order by last name) for their assistance:

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- Jorge Da Silva
- Honor Lind
- Emma Jane Taylor

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- Danielle (Danni) DeRoche
- Alexandra (Alex) Kowalski

SySTEAM community members & mini-conference attendees

Last but not least, SySTEAM wishes to acknowledge its community members and affiliates for helping make this mini-conference a reality. The community's support and enthusiasm for the mini-conference concept, as well as its vivacious response to the inaugural SySTEAM Call for Papers and Call for Peer Reviewers, have been a key part of making this mini-conference a success and for validating interest in SySTEAM community events. SySTEAM thanks all the individuals who sent in abstracts and peer reviewer applications for consideration, as well as all of our mini-conference participants, for being willing to share their thoughts and ideas with their fellow community members and for their continued exuberance in supporting the SySTEAM mission, vision, and goals.