2018-2019 ACSA/AISC STEEL DESIGN STUDENT COMPETITION

Category I **Intermodal Transportation Center**

Category II **Open**

PROGRAM

Image Credit: Students: Xiao Wang, Hanwei Fan & Yifeng Guo, Iowa State University | Faculty Sponsor: Thomas Leslie, Iowa State University
Project: *Miami S Stadium* | 2014-2015 Steel Competition: 2nd Place Winner

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The Association of Collegiate Schools of Architecture (ACSA) is pleased to announce the 19th Annual Steel Design Student Competition for the 2018-2019 academic year. Administered by the Association of Collegiate Schools of Architecture (ACSA) and sponsored by the American Institute of Steel Construction (AISC), the program is intended to challenge students, working individually or in teams, to explore a variety of design issues related to the use of steel in design and construction. Steel must be used as the primary structural material and contain at least one space that requires long-span steel structure, with special emphasis placed on innovation in steel design.

THE OPPORTUNITIES

The 2018-2019 Steel Design Student Competition will offer architecture students the opportunity to compete in two separate categories:

Category I INTERMODAL TRANPORTATION CENTER

Challenges architecture students to design an intermodal transportation center that proposes a cohesive transit system that includes components such as international, regional, and local train stations, bus terminals, ports, airports and spaceports in a major urban location.

Category II OPEN

Offers architecture students the opportunity to select a site and building program using steel as the primary material. This competition category permits the greatest amount of flexibility for any building type.

Students may not enter both categories of the competition.

CRITERIA FOR JUDGING

Criteria for the judging of submissions will include: creative use of structural steel in the design solution, successful response of the design to its surrounding context, and successful response to basic architectural concepts such as human activity needs, structural integrity, and coherence of architectural vocabulary.

Submissions must clearly represent the selected program. In addressing the specific issues of the design challenge, submissions must clearly demonstrate the design solution's response to the following requirements:

- An elegant, expressive understanding of the material, steel, deployed with maximum innovative potential with a minimum of one long-span space
- A strong conceptual strategy translated into a coherent integrated design proposal
- An articulate mastery of formal concepts and aesthetic values
- A compelling response to the physical and cultural context of the scheme
- A mature awareness and innovative approach to sustainability as a convergence of social, economic and environmental issues
- A thorough appreciation of human needs and social responsibilities

ADVANTAGES OF STEEL

Structural steel offers a number of benefits in building design including the capacity to bear great loads in tension and compression, high resiliency and performance under harsh and difficult conditions, (e.g., earthquakes and hurricanes) and the ability to span great distances with minimal material. Steel can be shaped by many processes, ranging from standard rolled sections to custom castings and digitally generated components. It can be prefabricated and delivered for site assembly, and it can be erected quickly under almost any weather condition to meet tight construction schedules. Similarly, steel's wide use for building cladding highlights its durability, technical capabilities and aesthetic versatility.

Steel can be easily modified during the life cycle of a building to accommodate changing occupant requirements. As the most recycled material in the world, steel is an environmentally sound building material choice. Today, structural steel is 97% recycled with the primary source being automobiles. Architects praise the natural beauty of steel and are excited about exposing it in the design of their structures to emphasize grace, slenderness and strength, and in their building envelopes to enhance environmental performance and aesthetic character.

Curved steel is an art, providing endless possibilities for architectural expression. Curved steel enhances the visibility of any building project - from the largest monumental project to that building down your street. Curved steel is a unique way to increase the design creativity of your next building project. And most importantly, curved steel is readily available nationally from a number of qualified AISC Associate Member Bender-Rollers. AISC information on curved steel: https://www.aisc.org/technical-resources/curved-steel/.

Category I

Intermodal Transportation Center

We thrive by mobility. Modes of movement, through networks in various scales: people, goods, and information, profoundly shaped contemporary cities, architecture, and the culture of human interaction. As globalism coincided with urbanization, mega-regions were made possible by intermodal transportation systems which link a series of metropolitan areas.

> ***Intermodal Transportation. The movements of passengers or freight from an origin to a destination relying on several modes of transportation. Each carrier is issuing its own ticket (passengers) or contract (freight). The movements from one mode of transport to another is commonly taking place at a terminal specifically designed for such a purpose. Therefore, intermodal transportation in the literal sense refers to an exchange of passengers or freight between two transportation modes, but the term has become more commonly used for freight and container transportation across a sequence of modes. In North America, the term intermodal is also used to refer to containerized rail transportation.***[1]

By using complex multi-modal networks which involve the use of at least two different transportation modes, the forms of intermodal transport systems grow in capacity and advance in performance. These integrated networks enhance economic activity, but also provide an exciting opportunity for architecture to facilitate a critical element of connection between intermodal transport chains, articulation nodes.

> ***An articulation node is a location that promotes the continuity of circulation in a transportation system by supporting transport chains and providing the added value that such flows require. It is an interface, a gateway, between different spatial systems (e.g. global market and regional economy) that includes terminal facilities, but also the numerous activities linked with these facilities. For passenger transport chains, this could involve hotels, parking lots, restoration, and access to local transportation. They tend to be simple in function .***[2]

THE DESIGN

Category I seeks to explore the convergence of two or more different modes of transportation systems within the urban context. The design should focus on a hub that synthesizes multiple transportation systems. The intermodal transportation center should respond to context as an infrastructural connection, environmental catalyst, and cultural identity. Significant design goals are:

- Finding an innovative solution for the Articulation Node as part of an infrastructural network.
- Creating a visible interpretation of urbanism to represent this intersection between two or more regions as a gateway.
- Reinforcing architectural form by innovative uses of steel structure for the main terminal.

THE SITE

The intermodal transportation center should be located in an international/inter-regional geographic location within an urban context. The site can be real or hypothetical and is selected by the Faculty Sponsor and/or the students. The criteria for selecting the project site include the following:

- Size: the project is flexible in size, but it should be appropriate for the scale of transportation modes. Modern terminal infrastructures consequently require massive investments and are among the largest structures ever built.[3]
- Context: the project site should be located where two or more major transportation modes (air, land, or water) are adjacent or within a few city blocks. How could environmental design considerations in urban settings affect a design solution?
- Access: the project site should have access to various public transit systems. How will the design of the ITC ensure that it becomes a link between the transportation chain and the urban fabric?

The site investigation should be a vital part of the masterplan.

1. Rodrigue, Jean-Paul "The Geography of Transport Systems_The spatial organization of transportation and mobility." https://transportgeography.org/?page_id=1768 (accessed August 20, 2018)
2. Rodrigue, Jean-Paul "The Geography of Transport Systems_The spatial organization of transportation and mobility." https://transportgeography.org/?page_id=7730 (accessed August 20, 2018)
3. Rodrigue, Jean-Paul "The Geography of Transport Systems_The spatial organization of transportation and mobility." https://transportgeography.org/?page_id=3009 (accessed August 20, 2018)

Category I

Intermodal Transportation Center

THE PROJECT SCOPE

- Masterplan includes regional scale drawings or diagrams to illustrate the site analysis, impact study of the Intermodal Transportation Center, and overall design intent, related to urban development plans.
- Design the hub/transportation terminal and its amenities. The facility should be a center of interaction and a significant symbol of the cultures it serves.
- Design and carefully site the facility with economy and efficiency in mind.
- Utilize the concepts of conservation and sustainability to reduce the building's environmental impacts and energy consumption.
- The project should be developed with an integrative approach to the innovative use of building materials and systems: space, structure, and enclosure.

THE PROGRAM

- **The main transit terminals _ The Articulation Nodes(AN)**: This is a core space where passengers and/or freight will interchange seamlessly between in-bound and out-bound. The interrelated transportation hub [main terminal space] is a large scale and cohesive space which must include a long-span steel structure. The innovative superstructure will promote the concept of the AN. The powerful expression of architectural form is a key to represent the intersection between the regional character and cultural intervention within this unique program. The core terminal space will be a secured space with typical functional requirements; various seating areas, public amenities, service, and commercial spaces. The size of the AN should be larger than 500,000 square feet and up to 1.2 million square feet as the gross building area.
- **Arrival**: This is an intermediate function between the project and its context. The entrance should have a strong identity, concurrently respecting its surroundings. This should be situated where the public can visually experience the main terminal without passing the secure check points. The square footage of this space should be included in the main transit terminal.
- **Administrative Service & Support**: Staff facilities, meeting spaces, and building support spaces. The square footage of this space should be included in the main transit terminal.
- **Local transit**: This is a continuous connection to local transportation networks with secure check points. The space can be connected or separated from the entry sequence, but must be part of the main circulation. The square footage of this space should be included in the main terminal.
- **Community spaces**: These spaces should be multi-purpose spaces such as conference space, galleries, various sizes of gathering spaces, and an information center. Convenience services such as a coffee shop, book store or other small retail should be included. Spaces should be flexible and easily accessible from the entry sequence and transit service. The square footage of this space should be included in the main terminal.
- **Commercial spaces**: A transportation center often serves as the city's gateway for visitors and reflects the city's heritage, people, and values. The new facility shall be composed of: Hotel, shopping, and/or identify needs for the context. The size should be larger than 200,000 square feet and up to 500,000 square feet.

Category II

Open

The ACSA/AISC 2018-2019 Steel Design Student Competition offers architecture students the opportunity to participate in an open competition with limited restrictions. This category will allow the students (with the approval of the sponsoring faculty member) to select a site and building program.

- The Category II program should be of equal complexity as the Category I program.
- Students entering Category II must submit a written building program, including a brief description the building type, gross square footage and project location, along with the online submission in the Program Edits (copy/paste text box).

RESTRICTIONS

To enter the open competition, students may select any building occupancy other than transportation center. Students may not enter both categories of the competition.

CONSTRUCTION TYPE

The design project must be conceived in structural steel construction. A strategy should be considered that evaluates a method for reducing overall construction cost using innovative methods of structure, fabrication, and construction.

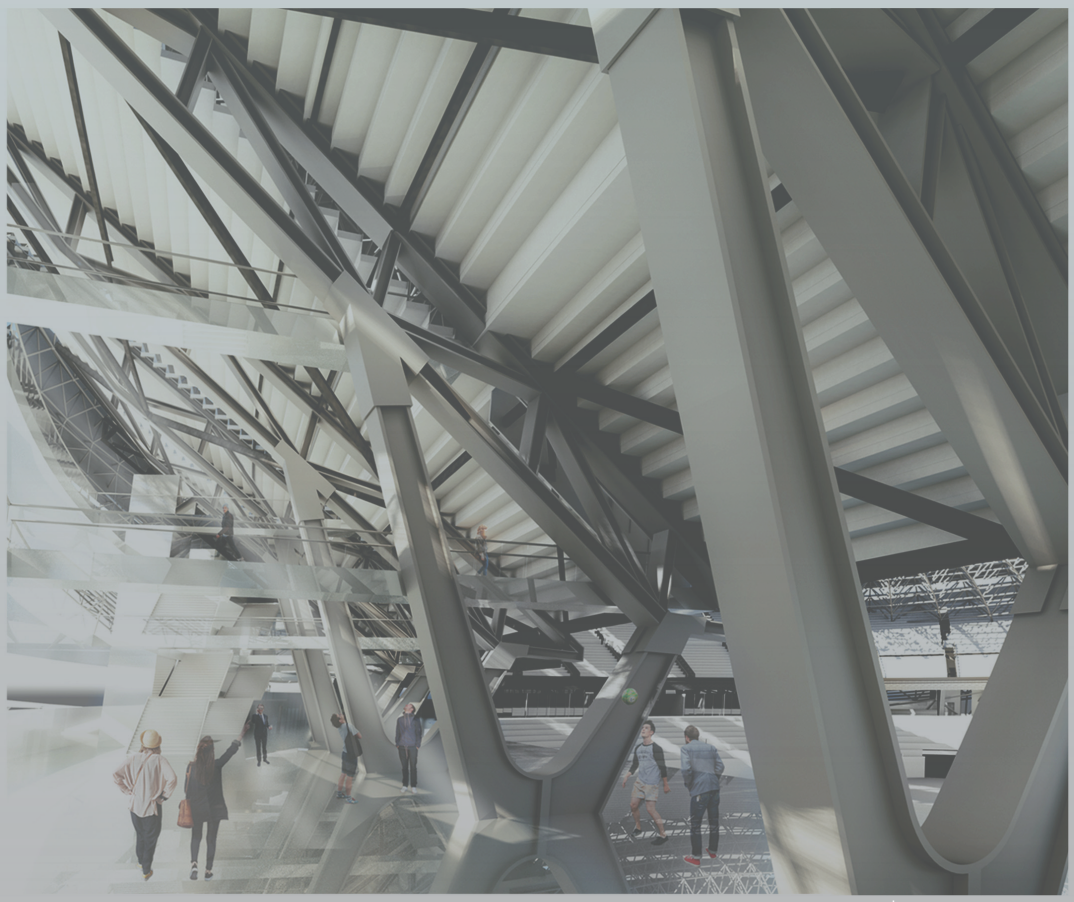


Image Credit: Students: Xiao Wang, Hanwei Fan & Yifeng Guo, Iowa State University | Faculty Sponsor: Thomas Leslie, Iowa State University | Project: *Miami S Stadium* **| 2014-2015 Steel Competition: 2nd Place Winner**

RESOURCES

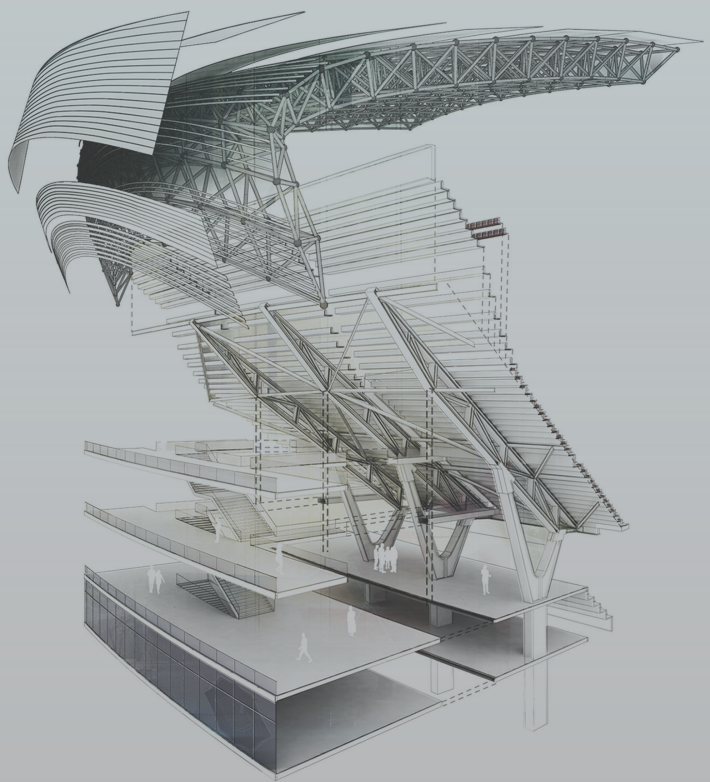
An intention of all ACSA competitions is to make students aware that research is a fundamental element of any design solution. Students are encouraged to research material properties and methods of steel construction, as well as precedent projects that demonstrate innovative use of structural steel.

Steel Construction References

1. AISC website: www.aisc.org
2. Modern Steel Construction: This authoritative monthly magazine is made available online free of charge. This magazine covers the use of fabricated structural steel in the variety of structural types. It presents information on the newest and most advanced applications of structural steel in a wide range of structures. Issues of Modern Steel Construction (1996 - Present) are available online. Visit www. modernsteel.com to view them.
3. Terri Meyer Boake. Understanding Steel Design: An Architectural Design Manual. (Birkhäuser 2013)
4. John Fernandez. Material Architecture. (Spon Press, 2006)
5. Victoria Bell and Patrick Rand. Materials for Design 2. (Princeton Architectural Press, 2014)
6. Shulitz, Habermann, Sobek. Steel Construction Manual. (Birkhäuser Basel 2000)
7. Annette LeCuyer. Steel and Beyond. (Birkhäuser Basel 2003)
8. Lyall, Sutherland. Remarkable Structure: Engineering today's Innovative Buildings. (Princeton Architectural Press, 2002)

Transportation References

1. The Geography of Transport Systems: https://transportgeography.org/?page_id=7730



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COMPETITION GUIDELINES (Category I & Category II)

SCHEDULE

April 3, 2019	Registration Deadline (free registration)
May 22, 2019	Submission Deadline
Summer 2019	Winners Announced
Fall 2019	Publication of Summary Book

AWARDS

The design jury will meet in Summer 2019 to select winning projects and honorable mentions. Winners and their faculty sponsors will be notified of the competition results directly. A list of winning projects will be posted on the ACSA web site at www.acsa-arch.org and the AISC web site at www.aisc.org.

Winning students and their faculty sponsors will receive cash prizes totaling **$14,000** with distribution as follows:

Category I **TRANSPORTATION CENTER**		Category II **OPEN**	
First Prize		***First Prize***	
Student	$2,500	Student	$2,500
Faculty Sponsor	$1,000	Faculty Sponsor	$1,000
Second Prize		***Second Prize***	
Student	$1,500	Student	$1,500
Faculty Sponsor	$750	Faculty Sponsor	$750
Third Prize		***Third Prize***	
Student	$750	Student	$750
Faculty Sponsor	$500	Faculty Sponsor	$500

A limited number of honorable mentions may also be awarded at the jury's discretion. Prize-winning submissions will be exhibited at the 2020 ACSA Annual Meeting and the 2020 AIA National Convention as well as published in a competition summary publication.

ELIGIBILITY

Because the support of AISC is largely derived from steel companies whose markets are mainly in the U.S., the competition is open to students from ACSA Full and Candidate Member Schools from the U.S. and Canada, as well as ACSA Affiliate Members Schools from the U.S., Canada, and Mexico only.

The competition is open to upper level students (third year or above, including graduate students). All student entrants are required to work under the direction of a faculty sponsor. Entries will be accepted for individuals as well as teams. Teams must be limited to a maximum of five students. Submissions should be principally the product of work in a design studio or related class.

USE OF STEEL

Steel must be used as the primary structural material. Design proposals must contain at least one space/element that requires long-span steel structure, with special emphasis placed on innovation in steel design. The most compelling proposals will inevitably integrate the use of steel into the design of the project at multiple levels, from primary structure to building envelope and tectonic details.

COMPETITION GUIDELINES (Category I & Category II)

CODE INFORMATION

Refer to the International Building Code and the local zoning ordinance for information on parking requirements, height restrictions, set backs, easements, flood, egress and fire containment. All proposals must be designed to meet requirements for accessibility; for guidelines, refer to the Americans with Disabilities Act and the principles of Universal Design.

REGISTRATION

A faculty sponsor is required to enroll students online (available at www.acsa-arch.org) by April 3, 2019. Registration can be done for your entire studio or for each individual student or team of students participating. Students or teams wishing to enter the competition on their own must have a faculty sponsor, who should complete the registration. There is no entry or submission fee to participate in the competition. Each registered student and faculty sponsor will receive a confirmation email that will include information on how the student(s) will upload final submissions online. Please add the email address competitions@acsa-arch.org to your address book to ensure that you receive all emails regarding your submission.

During registration, the faculty will have the ability to add students, add teams, assign students to teams, and add additional faculty sponsors. Registration is required by April 3, 2019, but can be changed, edited, and added to until a student starts a final submission; then the registration is no longer editable.

FACULTY RESPONSIBILITY

The administration of the competition at each institution is left to the discretion of the faculty within the guidelines set forth in this document. Work on the competition should be structured over the course of one semester during the 2018-2019 academic year.

Each faculty sponsor is expected to develop a system to evaluate the students' work using the criteria set forth in this program. The evaluation process should be an integral part of the design process, encouraging students to scrutinize their work in a manner similar to that of the jury.

DIGITAL SUBMISSION FORMAT

Submissions must be presented on four 20" x 20" digital boards. All boards are required to be uploaded through the ACSA website as Portable Document Format (PDF) or image (JPEG) files. The names of student participants, their schools, or faculty sponsors, must NOT appear on the boards, or in the project title or project title file name(s).

DESIGN ESSAY or ABSTRACT

A brief essay, 300 words maximum, is required as part of the submission describing the most important concepts of the design project. Keep in mind that the presentation should graphically convey the design solution and context, and not rely on the design essay to convey a basic understanding of the project. The names of student participants, their schools, or faculty sponsors, must NOT appear in the design essay. This abstract is included in the final online submission, completed by the student(s) in a simple copy/paste text box.

PROGRAM SUMMARY

A program summary diagram/text of spaces and areas is required as part of the submission. All interior and exterior spaces are to be included; total net and gross areas are required.

COMPETITION GUIDELINES (Category I & Category II)

REQUIRED SUBMISSION DOCUMENTS

Submissions must include (but are not limited to) the following required drawings:

- Three-dimensional representations - in the form of axonometrics, perspectives showing the proposal in its context, montages and/or physical model photographs – to illustrate the character of the project;
- Site plan showing proposal in its context of surrounding buildings and topography, together with details of access/ circulation;
- Building/site sections sufficient to show site context and major spatial and program elements;
- Floor plans to show program elements, spatial adjacencies and navigation strategies;
- Large scale drawing(s), either orthographic or three dimensional, illustrating:
    - the use and detailing of steel for building structure and/or envelope
    - integrated design

Incomplete or undocumented entries will be disqualified. All drawings should be presented at a scale appropriate to the design solution and include a graphic scale. The site plan should include a north arrow.

ONLINE PROJECT SUBMISSION

The student is required to submit the final entries that must be uploaded through the ACSA Competition website at www.acsa-arch.org by 11:59 pm, Pacific Time, on May 22, 2019. If the submission is from a team of students, all student team members will have the ability to upload the digital files. Once the final submit button is pressed no additional edits, uploads, or changes can be made. You may "save" your submission and return to complete. Please note: The submission is not complete until the "complete this submission" button has been pressed. For team projects, each member of team projects may submit the final project, but each project should be submitted only once. Once the final submission is uploaded and submitted, each student will receive a confirmation email notification.

The final submission upload must contain the following:

- Completed online registration including all team members and faculty sponsors,
- Each of the four 20"x20" boards uploaded individually as a high resolution Portable Document Format (PDF) or image (JPEG) file,
- A design essay or abstract,
- A program summary diagram/text of spaces and areas (300 words maximum).

The names of student participants, their schools and faculty sponsors must NOT appear on the boards, abstract, program summary, or in the file name.

Winning projects will be required to submit high-resolution original files/images for use in competition publications and exhibit materials. By uploading your files, you agree that the Association of Collegiate Schools of Architecture (ACSA) has the rights to use your winning submission, images and materials in a summary publication, online and in promotional and exhibition resources. ACSA will attribute authorship of the winning design to you, your team, faculty and affiliation. Additionally, you hereby warrant that the submission is original and that you are the author(s) of the submission.

COMPETITION ORGANIZERS

Administrative Organization

Association of Collegiate Schools of Architecture (ACSA)
Leading Architectural Education & Research

ACSA is a nonprofit, membership association founded in 1912 to advance the quality of architectural education. The school membership in ACSA has grown from 10 charter members to over 250 schools in several membership categories. These include full membership for all accredited programs in the United States and government-sanctioned schools in Canada, candidate membership for schools seeking accreditation, and affiliate membership for schools for two-year and international programs. Through these schools, over 5,000 architecture faculty members are represented. In addition, over 500 supporting members composed of architecture firms, product associations and individuals add to the breadth of interest and support of ACSA goals. ACSA provides a major forum for ideas on the leading edge of architectural thought. Issues that will affect the architectural profession in the future are being examined today in ACSA member schools.

Sponsor

The **American Institute of Steel Construction** (AISC), headquartered in Chicago, is a non-profit technical institute and trade association established in 1921 to serve the structural steel design community and construction industry in the United States. AISC's mission is to make structural steel the material of choice by being the leader in structural-steel-related technical and market-building activities, including: specification and code development, research, education, technical assistance, quality certification, standardization, and market development. AISC has a long tradition of more than 90 years of service to the steel construction industry providing timely and reliable information.

Membership to AISC is free to university faculty and full-time students, and AISC membership provides valuable benefits. Information can be found at www.aisc.org/universityprograms.

FOR MORE INFORMATION

Program updates, including information on jury members as they are confirmed, may be found on the ACSA web site at www.acsa-arch.org/competitions.
Additional questions on the competition program and submissions should be addressed to:

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Competition Program written and developed by: Seung K. Ra, Oklahoma State University; along with Eric Wayne Ellis, ACSA; & Christina Harber, AISC.