

2023-2026 Kent D. Peaslee Junior Faculty
Year-End Report 2025-2026
Enhance Student Participation in Steel Industry

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Proposed period of performance: 3 Years.

~~Year 1: August 2023—July 2024~~

~~Year 2: August 2024—July 2025~~

~~Year 3: August 2025—July 2026~~

Estimated Budget: \$150,000.00 total.

~~Year 1: \$50,000.00~~

~~Year 2: \$50,000.00~~

~~Year 3: \$50,000.00~~

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1 Project Summary

This report highlights the 2025–2026 achievements of Dr. Mario Buchely as the Kent D. Peaslee Junior Faculty. Over the past year, Dr. Buchely has significantly advanced student participation and industry collaboration in metallurgical engineering. Key milestones include refining the "Forging-in-the-Box" educational tool and expanding digital outreach across YouTube and Instagram to inspire future steel professionals.

Dr. Buchely secured multiple research initiatives as PI and Co-PI through the Peaslee Steel Manufacturing Research Center (PSMRC), hosted distinguished guest speakers, and presented at prestigious industry conferences. Furthermore, this grant sponsored three impactful industrial plant tours and supported numerous undergraduate research opportunities and student competition teams. Combined with K-12 school demonstrations and the Kummer Colloquium, these comprehensive efforts continue to strengthen the pipeline between academia and the iron and steel industry.

2 Project Goals

2.1 Forging-in-the-box

Figure 1 illustrates the original schematic of Dr. Buchely's "Forging-in-the-Box" concept. To bring the "Forging-in-the-Box" concept to life, all the necessary equipment was acquired to perform portable, hands-on demonstrations of induction heating using a mobile induction gun. This includes Mini-Ductor Venom HP (Figure 2a), a portable and foldable workbench (Lincoln K5334-1, Figure 2c), a bench vise (Figure 2c) for securing the workpiece and a FLIR TG297 thermal camera (Figure 2d), custom-designed water-cooled induction coil (Figure 2e), and a compact chiller unit (Figure 2df), which is connected to the water-cooled induction coil. Unfortunately, during testing, it was discovered that the induction gun was not powerful enough to heat the steel blanks to the elevated temperatures required for actual closed-die forging operations.

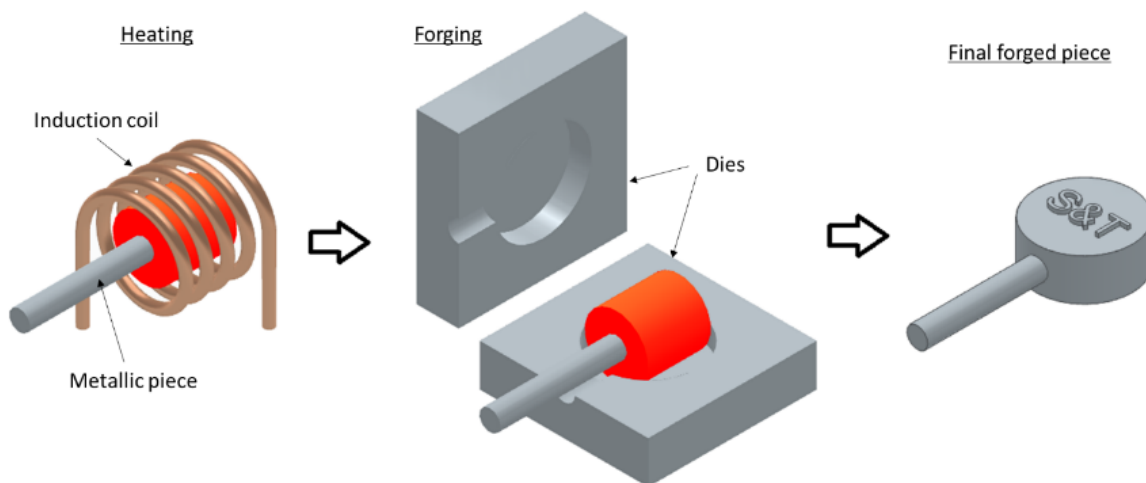


Figure 1. Schematic concept of Forging-in-the-box.



(a)



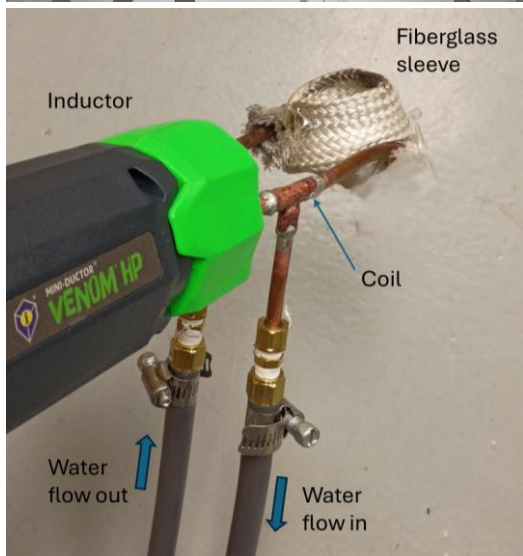
(b)



(c)



(d)



(e)



(f)

Figure 2. Equipment that was acquired to build “Forging-in-the-box” tool (a) Induction gun, (b) Metallic table, (c) bench vise, (c) Thermal camera, (e) water-cooled induction coil, and (f) compact chiller unit.

Despite this limitation, the acquired system has been successfully repurposed into a highly effective educational tool. The portable apparatus has been actively used in student demonstrations to vividly showcase rapid induction heating, the thermomechanical bending of steel bars at elevated temperatures, and the rapid annealing of high-carbon steel bars, effectively demonstrating how heat treatment can prevent material brittleness. These interactive exercises continue to captivate students, providing them with a real-time, visual understanding of fundamental metallurgical and heat-treating principles. Moving forward, it is expected to improve the system and potentially integrate a larger, more powerful induction unit in the future to fully achieve the initial goal of live, portable forging demonstrations.

2.2 Outreach in social media

Dr. Buchely has maintained a dedicated YouTube channel (refer to Figure 3) that showcases his work and expertise in metallurgical engineering. The channel can be accessed at: <https://www.youtube.com/channel/UCXr6nkSUcIAbSkzGdZRC4pg>. Over the past year, the channel has emerged as a valuable platform to expand his educational influence, with content growing by 7 informative videos to bring the total to 90 videos. This expansion is reflected in a ~45% subscriber increase, rising from 231 to 290 subscribers. Cumulative viewership also saw a substantial jump, rising from approximately 28.8K to 36.5K views across all videos, driven notably by popular content such as the video “Plot stress-strain curves from tensile testing using Matlab” (1,524 views).

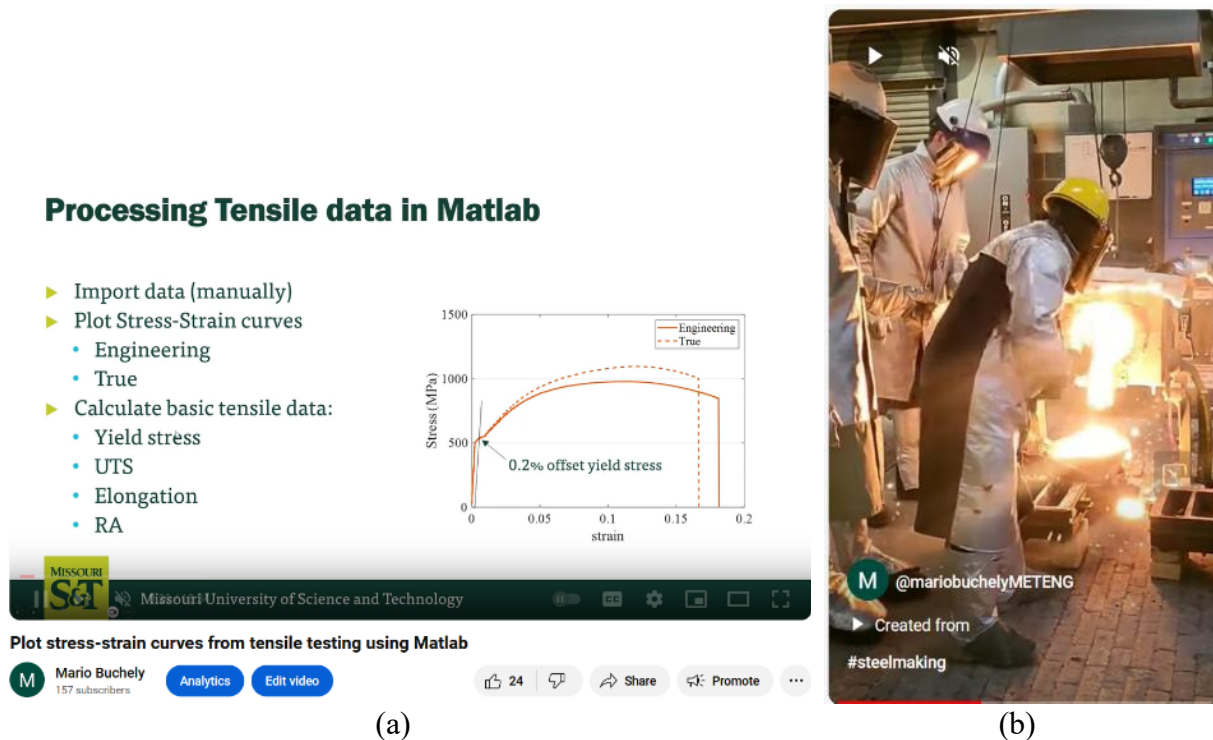


Figure 3. Screenshots of Mario Buchely YouTube channel most popular videos: (a) Plot stress-strain curves from tensile testing using Matlab (<https://www.youtube.com/watch?v=rUmaA-p2bys>), and (b) #Steelmaking (<https://www.youtube.com/shorts/W3sEkXUboLc>).

In tandem with YouTube, Dr. Buchely continued expanding his Instagram account over the last year (Figure 4). He has now shared 40 posts (an increase of 12 posts over last year) showcasing various metallurgical activities. The profile has steadily gained traction, reaching 110 followers and capturing 1,488 views within the last 90 days. The account can be found at:

<https://www.instagram.com/buchelym7/>.

Furthermore, Dr. Buchely continued developing his Facebook page (Figure 5) as part of his broader digital outreach strategy. Although still in its early stages with 8 followers, the platform is steadily gaining visibility. It holds strong potential as a tool for future engagement during conferences, educational fairs, and community events, allowing content to be shared directly with a broader audience interested in steel-related education and research.



Figure 4. Screenshots of Mario Buchely Instagram profile (<https://www.instagram.com/buchelym7/>).

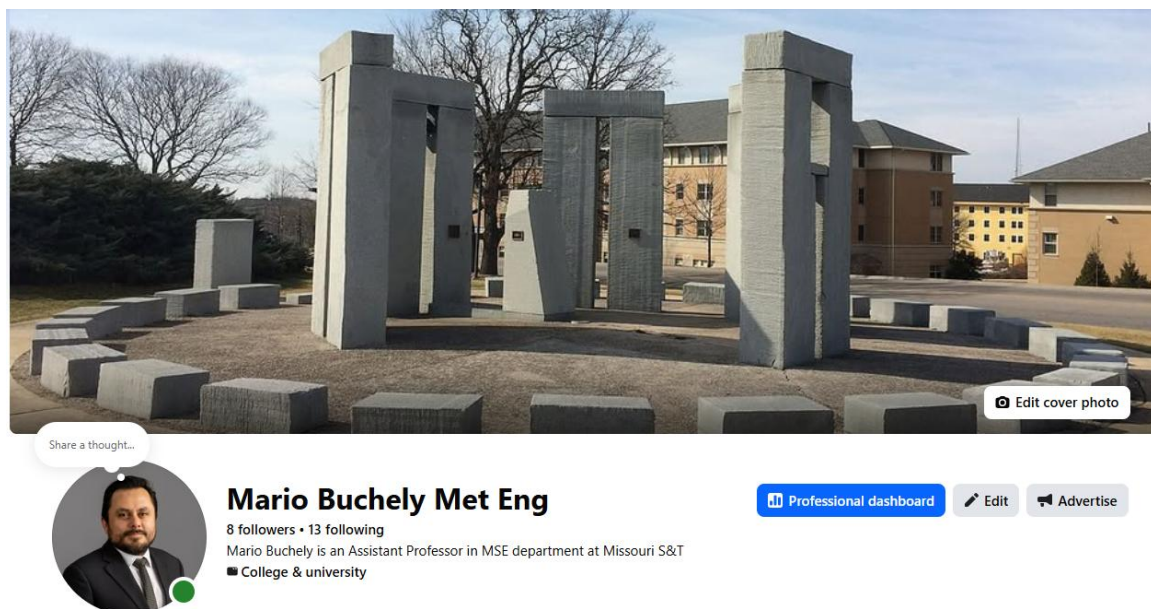


Figure 5. Screenshots of Mario Buchely Facebook profile:
(<https://www.facebook.com/profile.php?id=61555455400118>).

To further broaden the real-time reach of his educational content, Dr. Buchely continued with his X account (formerly Twitter) page (Figure 6). While still in its infancy with 6 followers and seven published posts, the platform presents a promising avenue for engaging with both academic and industrial audiences interested in steel-related topics.

Dr. Buchely remains fully committed to leveraging these digital platforms to actively promote metallurgical engineering and steel careers, and he expects to further expand his digital ecosystem by launching a dedicated TikTok account in the near future.



Figure 6. Screenshot of Mario Buchely X profile (<https://x.com/buchelym7>).

3 Dissemination of Results:

3.1 *Establishing Connections with Steel Companies and Industry Suppliers*

3.1.1 Collaborating with the Peaslee Steel Manufacturing Research Center (PSMRC) and steel-related research projects

Dr. Buchely's proactive outreach efforts have yielded significant results over the past year in the research side, collaborating with the Peaslee Steel Manufacturing Research Center (PSMRC) group at Missouri S&T. He participated in the last two group meetings in Nov. 25 and April 26 (see group pictures in Figure 7). By establishing connections with various steel-related companies, Dr. Buchely has successfully secured participation in new research projects. As a testament to his expertise, Dr. Buchely serves as Principal Investigator (PI) or Co-Principal Investigator (Co-PI) on the following initiatives during the last year:



PSMRC meeting, November 2025

PSMRC meeting, April 2026



Figure 7. Peaslee Steel Manufacturing Research Center (PSMRC) group at Missouri S&T.

New projects during the last 25-26 year as PI:

- The Missouri Defense Manufacturing Consortium. Office of Local Defense Corporation. Partially supporting one graduate (MSc.) Student in Materials Science and Engineering: Jacob Iticovici.
- Rapid Induction Heating Process for Thermomechanical Processing with Heating Rate Effects. Peaslee Steel Manufacturing Research Center (PSMRC). Supporting one graduate (PhD) Student in Materials Science and Engineering (to be selected).

New projects during the last 25-26 year as Co-PI:

- Advanced High Yield Strength Steels for Future Navy Platforms. Naval Surface Warfare Center Carderock Division, NSWCCD. Supporting one graduate (PhD) Student in Metallurgical Engineering: Alex Schumacher.
- Electrification of Combustion Processes in Steel Manufacture Using Microwave Assisted Plasma Heating. Electrified Processes for Industrial eXcellence EPIX, Arizona State University.
- Repair Technologies and 3D Printing for Sustainment and Manufacturing at Missouri. National Center for Manufacturing Sciences.

- Low-Cost Vehicle Armor Manufacturing Process. Buffalo Armory Group. Supporting one graduate (PhD) Student in Metallurgical Engineering: Evan Barth.

This list of projects increases the level of research and interaction between Missouri S&T and industry, promoting collaborative environment that benefits both sectors.

3.1.2 Inviting steel-related topics to present in the MSE seminar

To motivate students to participate in steel-related project, Dr. Buchely has actively engaged students by inviting guest speakers to the Missouri S&T MSE seminars during the Fall 25 and 26 semesters. The seminars were featured by a prestigious professor in Metallurgical Engineering, Dr. John Speer and Dr. David Van Aken, who shared their expertise with both undergraduate and graduate students, fostering valuable interaction and participation. Below, it shows details of the speaker, its seminar topics, and highlights his visits with photos (Figure 8 and Figure 9).



Figure 8. MSE seminar on Nov. 13th, 2025. Dr. John Speer, Professor in the Department of Metallurgical and Materials Engineering at The Colorado School of Mines. Seminar Presented by Dr. Speer: Next-Generation Steel Development for Automotive Lightweighting. In the left picture, Dr. David Van Aken, Dr. Laura Bartlett, and Dr. John Speer.

3.1.1 Attending conferences and committees related to steel processes.

Dr. Buchely actively expands his professional network and stays abreast of the latest advancements in steel processing by attending key industry conferences and review meetings. Over the past year, his participation included the Steel Founders' Society of America (SFSA) review meeting, International Rolling Conference, 2026 DoD Steel Summit, and AISTech 2026. Details about his activities and photos from these events are provided below.

- SFSA Research Review meeting, Rosemont IL, July 8-10, 2025 (Figure 10).
 - Oral presentation of research project: "Examining the Critical Transformation Temperatures in Martensitic Stainless Steel Castings"
- 2025 International Rolling Conference, Dallas TX, 2025 (Figure 11).

- Oral presentation: “Impact of Pilot-Scale Rolling and Heat Treatment on the Toughness of CrNiMoV Steel Plates”.



Figure 9. MSE seminar on March 19th, 2026. Dr. David Van Aken, Curators’ Distinguished Teaching Professor Emeritus at Missouri S&T and Fellow of ASM International. Seminar Presented by Dr. Van Aken: Iron blooms, ‘Sea People’ disrupt, and the Bronze Age ends.



Figure 10. Participation in SFSA Research Review meeting, Rosemont IL, July 8-10, 2025: (a) Presentation of research: “Examining the Critical Transformation Temperatures in Martensitic Stainless-Steel Castings”, and (b) Dr. Buchely with PhD student Ugochukwu Agbede and SFSA manager Caelan Kennedy during meeting.



Figure 11 Participation in 2025 International Rolling Conference: Dr. Buchely presenting the following paper: “Impact of Pilot-Scale Rolling and Heat Treatment on the Toughness of CrNiMoV Steel Plates”, in 2025 International Rolling Conference, Dallas TX, 2025.

- DoD 2026 Steel Summit, Warren MI, April 28th, 2026 (Figure 12).
 - Poster presentation: “Dynamic and Quasi-Static response of Ultrahigh hardness steel using modified Brazilian disk test”.
- AISTech 2026, Pittsburgh PA, May 4-6, 2026 (Figure 13).
 - Participation at AIST Foundation University-Industry Relations Roundtable, May 4th, 2026.
 - Committee meeting: AIST Metallurgy - Processing, Products & Applications Technology Committee (MPPTC). May 5th, 2026.
 - Committee meeting: AIST Special Alloy & foundry Committee. May 6th, 2026.



Figure 12. Participation in DoD 2026 Steel Summit, Warren MI, April 28th, 2026. Dr. Buchely presented the poster entitled: “Dynamic and Quasi-Static response of Ultrahigh hardness steel using modified Brazilian disk test”.

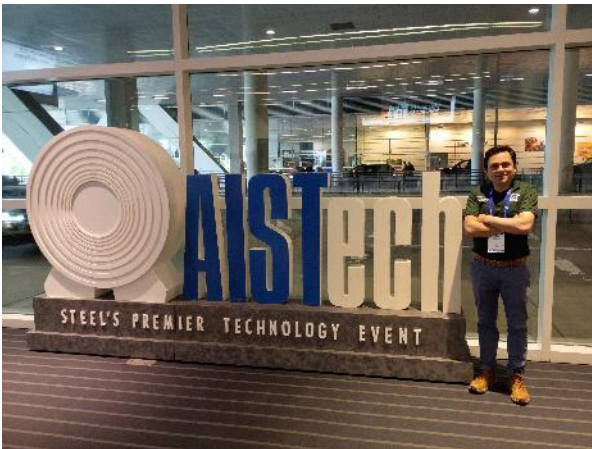


Figure 13. Participation in AISTech 2026 conference. Pittsburgh PA, May 4-6, 2026. Dr. Buchely accepting recognition as a Chair of Metallurgy – Processing, Products & Applications Technology Committee.

In his ongoing pursuit of professional development, Dr. Buchely further strengthened his knowledge and personal development by completing the courses "Metal Online" offered by Advanced Composites Manufacturing Innovation, IACMI, and "Personal Effectiveness Workshop" offered by the Office of Human Resources at Missouri S&T (see certificate in Figure 14). Additionally, Dr. Buchely participated in the EM Engineering Education Research and Scholar (EERS) workshop, offered by the KEEN foundation (see details in Figure 15), improving his technical research and teaching skills in his career.

Finally, during the 2026 MSE spring banquet, Dr Buchely was awarded the 2025-2026 Outstanding Metallurgical Engineering Professor (Figure 16). This is a nomination and award by the MET faculty and students' body at Missouri S&T.



(a)



(b)

Figure 14. Training: (a) Online Training: Metal Online, The Institute for Advanced Composites Manufacturing Innovation, IACMI. Completed: Nov.26th, 2025. (b) Personal Effectiveness Workshop, Leadership Development Program, Missouri S&T. Completed: March 2026.



Figure 15. Participation in Engineering Unleashed: EM Engineering Education Research and Scholar (EERS) workshop, KEEN foundation. Milwaukee, WI, Aug.4-7, 2025.



Figure 16. 2025-2026 Outstanding Metallurgical Engineering Professor, Students of Materials Science and Engineering Department, Missouri S&T, May 1st, 2026.

3.1.2 Organize a committee meeting or seminar.

In the past years, Dr. Buchely collaborated to coordinate committee meetings at Missouri S&T, including the following:

- AIST Plate Rolling Technology committee meeting Spring 23. Missouri S&T, March 27th and 28th, 2023 (Figure 17a).
- AIST Hot Sheet Rolling Technology committee meeting Fall 24. Missouri S&T, Sept. 18th and 19th, 2024 (Figure 17b).



(a)



(b)

Figure 17. Committee meetings at Missouri S&T: (a) AIST Plate Rolling Technology Committee Spring 23 and (b) AIST Hot Sheet Rolling Technology Fall 24 committee meeting.

During the last year, Dr. Buchely helped to organize the AIST International Rolling Conference (IRC). Dr. Buchely was part of the organizing committee, paper review chair, and session chair during the conference (Figure 18).



Figure 18. 2025 AIST International Rolling Conference, Dallas TX, Sept. 15-18, 2025.

3.2 Building Interest in Steel Industry

3.2.1 Visiting steel-related companies.

During the last year, three plant tours were sponsored using this grant including Nucor Steel Arkansas and Nucor-Yamato (Figure 19), US-Steel Granite city works and O’Fallon castings (Figure 20), and Nucor Memphis (Figure 21). Below you can find more information about those visits and tours with attached pictures.



Figure 19. Fall 2025 – Plant Visit with S&T students: “Nucor Steel Arkansas” and “Nucor-Yamato”, Blytheville AR, Oct. 24th, 2025.



Figure 20. Spring 2025 – Support plant visit with S&T students: “US-Steel, Granite City Works” and “O’Fallon Casting”, Granite City IL and O’Fallon MO, Feb. 16th, 2026.



Figure 21. Spring 2025 – Plant visit with S&T graduate students: “Nucor Steel Memphis”, Memphis TN, Feb. 27th, 2026.

3.2.2 PSRMC Undergraduate Research opportunities.

During the last year, three undergraduate (Victor, Justin and Ben) students have been fully supported, and other eight students were partially supported by this grant. The following list includes the students, their level and the semester supported.

- Victor DeLibera, Senior in Nuclear Engineering; supporting: Fall-25 and Spring-26.
- Justin Singleton, Senior in Metallurgical Engineering; supporting: Fall-25 and Spring-26.
- Benjamin Tobey, Sophomore in Metallurgical Engineering; Summer-25, Fall-25 and Spring-26.
- Duncan Emery, Junior in Metallurgical Engineering; supporting: Summer-25.
- Talon Jones, Junior in Metallurgical Engineering; supporting: Summer-25 and Spring-26.
- Samuel Coartney, Junior in Metallurgical Engineering; supporting: Fall-25 and Spring-26.
- Francisco DeDurana, Senior in Mechanical Engineering; supporting: Fall-25 and Spring-26.
- William Halls, Sophomore in Mechanical Engineering; supporting: Fall-25 and Spring-26.
- Aditya Yadav, Senior in Mechanical Engineering; supporting: Fall-25.
- Ashton Ventura, Senior in Metallurgical Engineering; supporting: Fall-25.
- Stephen McAllistere, Sophomore in Metallurgical Engineering; supporting: Spring-26.

3.2.3 Engaging MA Student Chapter and AFS Student Chapter in Steel-Related Projects and Competitions.

During the last year, different student activities were fully or partially supported by this AIST grant. In the following list and pictures, you can find more information about the different events that were sponsored.

- Erfan Heidari (PhD MET). Oral presentation: “Impact of Hot Rolling, Nickel and Vanadium additions on the Hot Tensile of AISI 4140 Steel” in the 2025 International Rolling Conference, Dallas TX, 2025 (Figure 22).
- Clark Nguyen (MET). Presenting poster “Effects of Heat Treatment on HSLA Steel”, and Naram Meesala (MSc MSE) oral presentation “Effect on Magnetic Properties of Simulated Twin Roll Cast Non-Grain Oriented Si Steel”, in MS&T25 Conference, Columbus OH, Sept. 28 - Oct. 1st, 2025 (Figure 23).



Figure 22. Erfan Heidari (PhD MET), oral presentation: “Impact of Hot Rolling, Nickel and Vanadium additions on the Hot Tensile of AISI 4140 Steel” in the 2025 International Rolling Conference, Dallas TX, 2025.

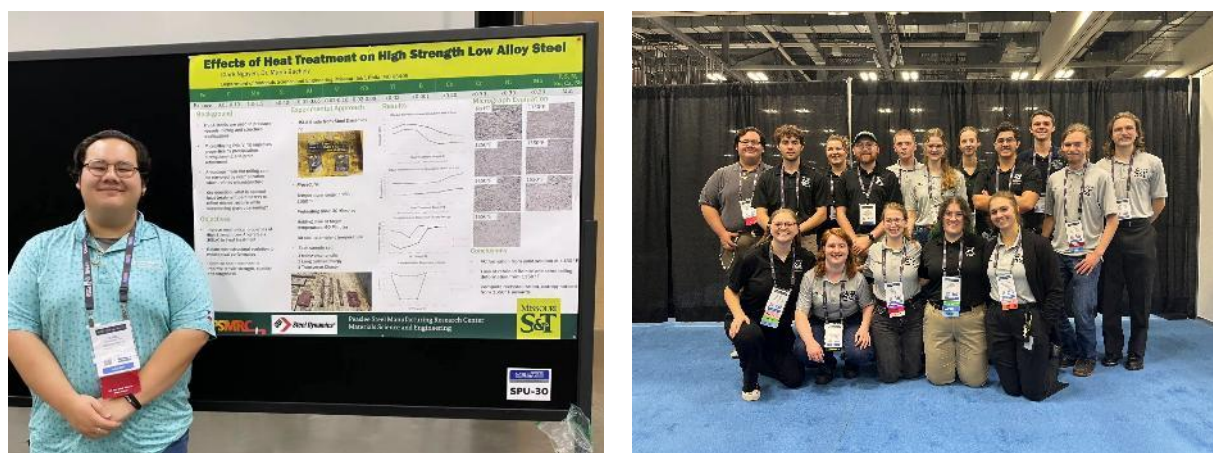


Figure 23. Support Student participation in MS&T25 Conference: Clark Nguyen (MET) presenting “Effects of Heat Treatment on HSLA Steel”, and Naram Meesala (MSc, MSE) “Effect on Magnetic Properties of Simulated Twin Roll Cast Non-Grain Oriented Si Steel”, MS&T25 Conference, Columbus OH, Sept. 28 - Oct. 1st, 2025.

- Ugochukwu Agbedo (PhD MSE). Support Student participation in AIST 2025 Specialty Melting, Refining and Casting – A Practical Training Seminar: Birmingham, AL, Oct. 6 - 9, 2025 (Figure 24).
- Ben Hilgers, Zoey Snyder, Savannah Cork, and Alex Schumager (MET). Supporting MSE student competition: “ASM Dome’s day”. Competition at the IMAT 2025 conference, Detroit MI, Oct. 20th-23th, 2025. **Supported team “Aluminati” earned the first place in the competition** (Figure 25)



- Figure 24. Support Student participation in AIST 2025 Specialty Melting, Refining and Casting – A Practical Training Seminar: Ugochukwu Agbedo (PhD MSE). Birmingham, AL, Oct. 6 - 9, 2025.



Figure 25. Supporting MSE student competition: “ASM Dome’s day”. Competition at the IMAT 2025 conference, Detroit MI, Oct. 20th-23th, 2025. Supported team “Aluminati” ((Ben Hilgers, Zoey Snyder, Savannah Cork, and Alex Schumager) earned the first place in the competition.

- Clark Nguyen (PhD MET). Support Student participation in “AIST 2026 The Making, Shaping and Treating of Steel 101”, Fort Worth, TX, March 3 - 4, 2026 (Figure 26).
- Samuel Courtney, Talon Jones, Carson Nuernberger, Elijah Hubbell, and Whalen Downs (MET). Support MSE student competition “Cast in Steel 2026: Horseman’s Axe”. Grand

Rapids MI, April 16-17, 2026. **Supported team “Marauders of McNutt” earned the 3rd place in the competition (Figure 27).**

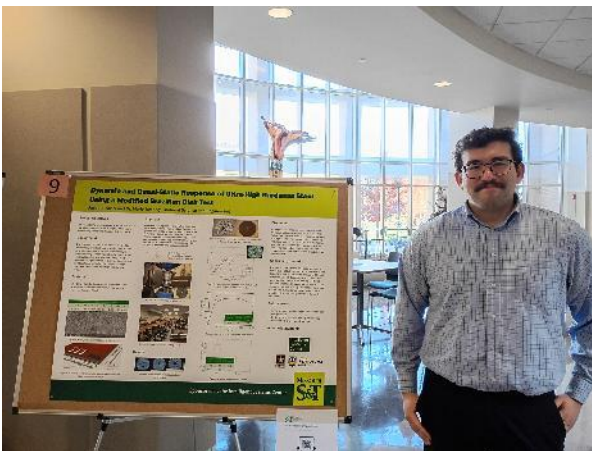


Figure 26. Support Student participation in “AIST 2026 The Making, Shaping and Treating of Steel 101”: Clark Nguyen (PhD MET). Fort Worth, TX, March 3 - 4, 2026.

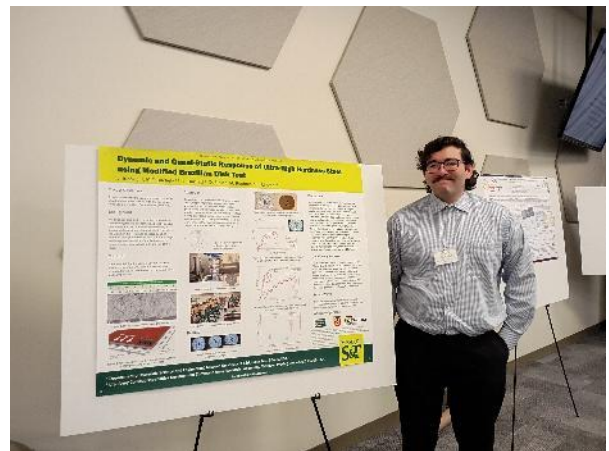


Figure 27. Support MSE student competition: “Cast in Steel 2026: Horseman’s Axe”. Grand Rapids MI, April 16-17, 2026. Supported team “Marauders of McNutt (Samuel Courtney, Talon Jones, Carson Nuernberger, Elijah Hubbell, Whalen Downs) earned the 3rd place in the competition.

- Jacob Iticovici (MSc MSE). Poster presentation: “Dynamic and Quasi-Static Response of materials using Modified Brazilian Disk Tests”, in two events: 1) Intelligent Systems Center (ISC), Missouri S&T, Nov. 18th, 2025, and 2) DoD 2026 Steel Summit, Warren MI, April 28th, 2026 (Figure 28).
- Stephen McAllister and William Halls (MET) Support student competition: “Undergraduate Student Project Presentation Contest”, and two graduate student (Clark Nguyen and Erfan Herdari) participation at the AISTech 2026 conference. Pittsburgh PA, May 4-6, 2026 (Figure 29).



(a)



(b)

Figure 28. ISC Poster presentation. Jacob Iticovici (MSc MSE) presenting: “Dynamic and Quasi-Static Response of materials using Modified Brazilian Disk Tests”, in (a) Intelligent Systems Center (ISC), Missouri S&T, Nov. 18th, 2025, and (b) DoD 2026 Steel Summit, Warren MI, April 28th, 2026.



Figure 29. Support student competition (Stephen McAllister and William Halls): “Undergraduate Student Project Presentation Contest”, and Graduate student participation at the AISTech 2026 conference. Pittsburgh PA, May 4-6, 2026.

- Ibrahim Mohammed (MSc MSE). Support student participation in “Fundamentals of Wire Manufacturing Course” and “Wire Explo 2026”, Milwaukee WI, May 6-7, 2026 (Figure 30).

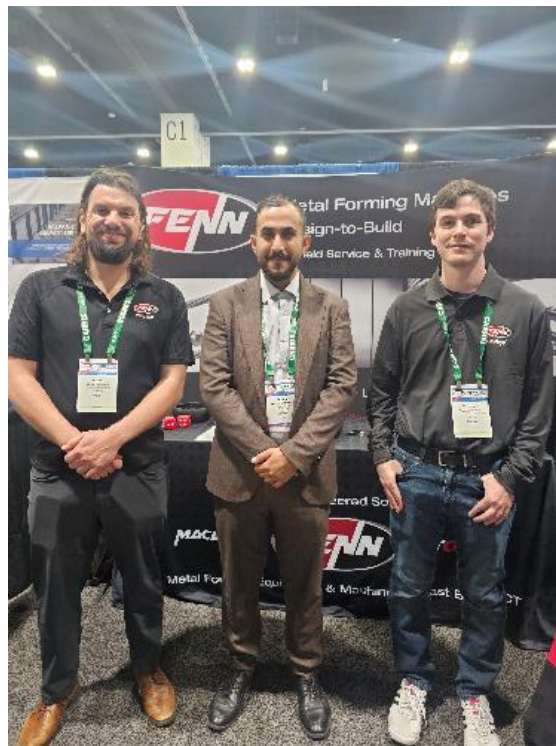


Figure 30. Support student participation in “Fundamentals of Wire Manufacturing Course” and “Wire Explo 2026”: Ibrahim Mohammed (MSc MSE). Milwaukee WI, May 6-7, 2026.

3.3 *Plans for a steel related student campus event and other programs to obtain direct student contact with the steel industry.*

3.3.1 ASM materials Summer camp and Outreach K-12 students:

During Summer 2025, he served as a tutor for the ASM camp geared towards prospective metallurgy students (see Figure 31). This valuable experience allowed him to share his knowledge and passion with aspiring professionals in the field. Dr. Buchely’s commitment continues, and he is slated to participate in the upcoming ASM camps in 2026.

Also, Dr. Buchely actively engaged with the community throughout the past year, participating in the following outreach events:

- Owensville High School, Owensville MO, Oct.30th, 2025 (Figure 32).

These events provided valuable opportunities to showcase the exciting world of materials science and engineering, particularly within the realm of steel, to K-12 students. Dr. Buchely remains dedicated to such outreach activities, aiming to further increase the visibility of the Missouri S&T and MSE department, and spark a passion for science and steel in younger generations.



Figure 31. Tutor of ASM Exploring Materials in Your World Camp: “Forging/Blacksmithing” and “Mechanical testing of materials”. MSE, Missouri S&T, July 21st - 24th, 2025.

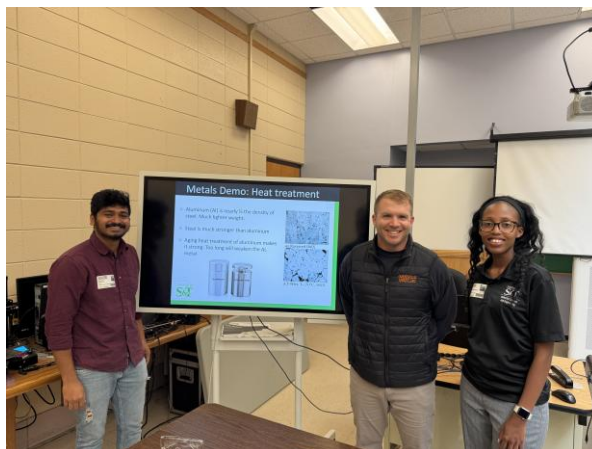


Figure 32. Supporting demo for High-school students: Owensville High School, Owensville MO, Oct.30th, 2025.

3.3.2 Kummer Colloquium: Introduction to Mechanical Testing in Steels:

During the last year, Dr. Buchely organized the Kummer Colloquium “Exploring Welding Metallurgy: Bridging Design, Build, and Material Science” (see Figure 33), where 10 students from the Vanguard Scholars Program of Kummer Student program at Missouri S&T, participated in the colloquium and were introduced to steel welding metallurgy. This activity was hosted to promote larger participation of different students on Campus in steel related labs and practices.

3.3.3 Participation of webinars and events Online

Dr. Buchely's commitment to inspiring future generations extends to a series presentation and discussion throughout the past year. These events are shown in the list below, aimed to ignite a passion for metallurgical engineering among future engineers.

- Iron and Steelmaking Day: “Round Table Discussion – What is the industry looking for in engineers and professionals?”, Montana Technological University, Feb. 17th, 2026.

- Invited lecture: “Emerging Frontiers in Steel Processing and Advanced Characterization”, Ansell Lecture, Metallurgical and Materials Engineering, Colorado School of Mines (see details in Figure 34).

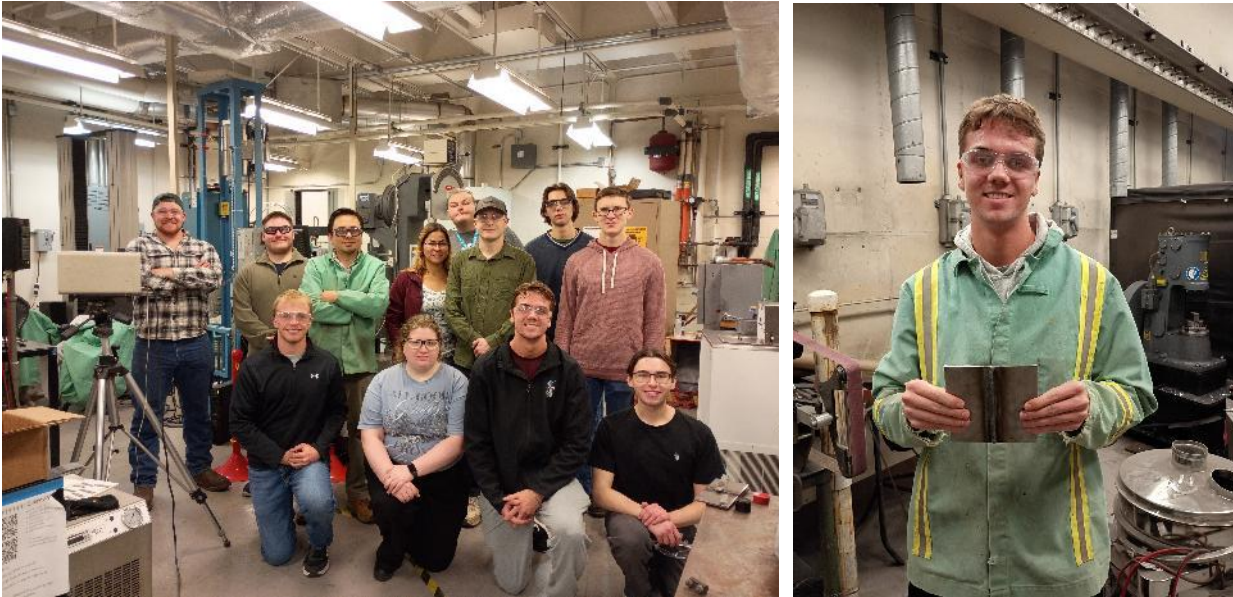


Figure 33. Kummer Colloquium: “Exploring Welding Metallurgy: Bridging Design, Build, and Material Science”. Vanguard Scholars Program, Kummer Student program, Missouri S&T. Four sessions: Oct. 28th, Nov. 4th, Nov. 12th, and Dec. 9th, 2025.



Figure 34. Invited lecture: “Emerging Frontiers in Steel Processing and Advanced Characterization”, Ansell Lecture, Metallurgical and Materials Engineering, Colorado School of Mines. Golden CO, March 5th, 2026.

Dr. Buchely also utilized the grant funds to organize two different training sessions of laboratory equipment in the metallurgical department. Details of those sessions are shown in Figure 35. With these activities, the use of metallurgical tools in characterization of steels was promoted among the MSE students.



Figure 35. Training sessions with MSE students: (a) Digital Image Correlation (DIC) system training, Missouri S&T, Jan. 15th, 2026., and (b) Arc Melter training, Missouri S&T, Feb. 13th, 2026.

Finally, Dr. Buchely partially support an internship of an International Student from Colombia in the Materials Science and Engineering Department, as described in Figure 36. With this collaboration, international collaboration and recognition of our campus was achieved.



Figure 36. Support of PhD International Intern: Sandra Restrepo Arcila, PhD candidate from National University of Colombia, who did her internship at MSE Missouri S&T during Nov. 25 to March 26.

5 Estimated distribution of total cost by year

The values provided below (Table 2) outline the approximate annual expenditures utilized from this grant over the three-year performance period. While the baseline budget allocation was set at \$50,000 annually, the actual expenditure distribution was dynamically adjusted each fiscal year to optimize research infrastructure, support student travel, and expand outreach capabilities. Throughout the lifecycle of the project, annual funds were consistently distributed across the following core areas:

- Support for student and faculty participation in industry events and professional conferences.
- Sponsorship of industrial plant tours and site visits.
- Coverage of conference registration fees for both graduate and undergraduate participants.
- Stipends and hourly financial support for undergraduate research assistants.
- Procurement of equipment, components, and supplies for the "Forging-in-the-Box" apparatus and K-12 community outreach demonstrations.
- Additional research consumables and project items directly supporting undergraduate student tasks.

Table 2. Actual and Allocated Expenditure Breakdown.

	Year 1	Year 2	Year 3
Total per year	\$24,650	\$30,080	\$80,990

At the time of preparing this final report, a remaining balance of \$14,280 is maintained within the grant account. In alignment with the educational and infrastructure goals of the award, these remaining funds will be fully utilized to partially support the purchase of specialized research equipment for Dr. Buchely's laboratory. This investment will directly enhance ongoing institutional research capabilities in the development and characterization of advanced electrical steels.

6 Mentors contact information.

Academic mentor

Dr. Ronald O'Malley
F. Kenneth Iverson Chair Professor
Director, PSMRC
Mat. Sci. & Eng. Missouri S&T
284 McNutt Hall, 1400 N. Bishop Ave.
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7 References

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8 Measuring of success

The following table shows the data that will be collected and be represented of the measuring of success of this program in the last year of this report 2025-2026. They are connected with the proposed Timeframe and Milestones from Table 1.

Data collected	Approximated goal	Achieved in Year 3
Number of demos utilizing “Forging in the box” and attending students	At least 1 demo per year (only 1 the first year)	2 demos
Number of subscribers and views in the current YouTube channel	Undefined for now	157 subscribers and ~18,800 views
Number of subscribers in the new social media channels	Undefined for now	14 followers, 177 views and 122 profile visits.
Research proposal related to steel topics	At least 1 proposal per year	5 new projects
Invitation to MSE seminar	At least 2 visitor per year	2 speakers
Senior design projects	At least 1 project in steel related research	1 project
Attending conferences and meetings	At least 2 conferences per year	4 conferences, meetings, and symposiums
Organize a Steel related seminar at S&T	At least 1 event in the 3 years of this award	1
Number of visited steel companies and number of students	At least 1 visit per year	2 visits and more than 50 students
Number of students participating in related student competitions	At least attend 2 competitions per year	3 competitions

Number of attending student to ASM summer camp	At least 1 camp per year	1 with 6 students
Number of visit fairs and schools	At least 2 visits per year	1 demos for K-12
Number of students in Kummer colloquiums	At least 2 colloquiums per year	1 Colloquium of 5 students
Number of presentations given in webinars and school online seminars	At least 2 presentations per year	2 webinars and class presentations
Number of students from MSE taking internships and Co-Ops with steel related industries	Undefined for now	5 MET/MSE students
Number of students taking positions in steel related fields	Undefined for now	9 MET students