



# CIVS Newsletter

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*"Where Ideas Become Reality"*

Issue 35



CENTER FOR INNOVATION THROUGH  
VISUALIZATION & SIMULATION

PURDUE  
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NORTHWEST



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## CIVS Contributes to Decarbonization via Four Large DOE Grants

CIVS has served as either the team leader or team member in the following four significant grants recently awarded by the Department of Energy (DOE): 1) **\$10 million grant** on "Development and Demonstration of an Industrial Hydrogen-fired Steel Reheating Furnace," led by CIVS. [Read more ...](#)

**GOALS**

- Industrial-scale demo of H<sub>2</sub>-fired RF
- Roadmap strategies for zero-CO<sub>2</sub> emissions
- Advanced integrated Virtual RF (iVRF)
- Reduction of CO<sub>2</sub> emissions and increased energy efficiency

**Partners:** ArcelorMittal, Argonne, Calumet College, CLIFFS, INDIANA FORUM, GERDAU, IVY TECH, NIPSCO, Oak Ridge National Laboratory, SMSVC, CIVS.

**Project Details:** EERE Funds: \$10 Million, Cost-Share: \$8.9 Million

2) **\$3 million grant** on "Scaling Hydrogen-Direct Reduced Iron Pathways to Decarbonize Iron and Steelmaking," led by Carnegie Mellon. [Read more...](#) 3) **\$19 million grant** on "Center for Steel Electrification by Electrosynthesis," led by Argon National Lab [Read more...](#) and 4) **\$1 Billion grant** on "Midwest Hydrogen Hub: MachH2." [Read more...](#)

## PNW CIVS and Partners Kickoff Event for \$10 million DOE grant



PNW CIVS along with industrial, education, federal, and elected leaders gathered on Oct. 11 to recognize a significant grant of nearly \$10 million from the U.S. Department of Energy (DOE)'s Industrial Efficiency and Decarbonization Office (IEDO) to support the Development and Demonstration of an Industrial Hydrogen-fired Steel Reheating Furnace (H2RF). The events included a combination of three activities: the Annual NWI One Region Luncheon, a tour of Cleveland-Cliffs Indiana Harbor Plant, and a ceremony at CIVS theater. [Read more....](#)



*"I am grateful for the continued leadership of Purdue Northwest's invaluable Center for Innovation through Visualization and Simulation and this outstanding partnership with the Department of Energy. Let us continue to build on this momentum to show how Northwest Indiana is the example of how we can create at the same time both a greener future and more economic opportunities."* - said U.S. Rep. Frank J. Mrvan. *"This project will demonstrate how we can curb those emissions with clean hydrogen, potentially changing the U.S. steel industry forever."* - said DOE Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy Jeff Marootian.



## U. S. Steel Collaborates with CIVS on Customized Crane Training Simulator

A group of executives, managers, and engineers from U. S. Steel visited CIVS on July 27 for reviewing collaborative projects and open trials of the U.S. Steel crane training simulator. On August 11, the customized Crane Training Simulator was installed at U. S. Steel Gary Works. The CIVS team will continue to develop similar customized versions for other plants. *“The value of working with students at PNW is that they are learning right along with us. They want to understand the process so they can make it better and drive progress past what we know is possible.”* said Mike Schwentor, Director of Operational Excellence at Gary Works. [Read more...](#)



## CIVS Researchers Gain Practical Knowledge through Site Visits and Training



In 2023, CIVS faculty, staff, and students had a number of field trips to steel plants of our SMSVC member companies to gain their practical knowledge on

ironmaking and steelmaking processes. They also attended technical meetings and training courses such as AIST Two-Day Continuous Casting Seminar, and One-Day Workshop on Electric Arc Furnace Practice and Evolution presented by Steve Ryan, NLMK Manager of Process Technology on October 31 at CIVS. [Read more...](#)

## CIVS VR Capability Highlights

CBF Forensics sells products based on PNW innovations originally developed at CIVS. [Read more...](#) CIVS also demonstrated the customized virtual die-casting simulator. [Read more...](#)

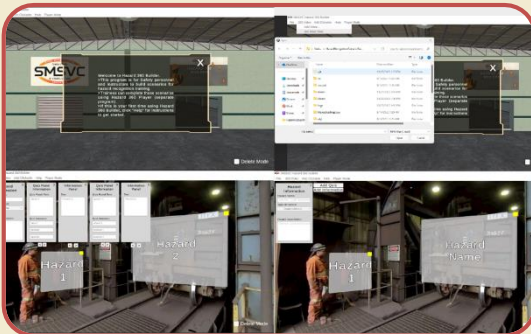


## EAF Models Presented at SteelSim 2023

On September 12, CIVS director Dr. Chenn Zhou, presented at SteelSim 2023 at The University of Warwick, UK. Her presentation entitled “CFD Modeling of Electric Arc Furnace(EAF) for Process Optimization” highlighted the advancement of the state-of-the-art computational fluid dynamics (CFD) models for simulating the entire EAF operation process developed by CIVS & SMSVC. [Read more...](#)



## CIVS Staff Awarded AIST Digital Technologies for Steel Manufacturing Grant



Congratulations to CIVS Senior Research Scientist John “Jack” Moreland for receiving the AIST Digital Technologies for Steel Manufacturing Grant for the Hazard Recognition Scenario Builder for On-Site Customizable Virtual Training project. Thanks to Industry Mentor Mike Schwentor, Director of Operational Excellence at U.S. Steel Gary Works. This project will address ever-present challenges the steel industry faces in ensuring its workforce keeps pace with the rapid advances in digital technologies and transforming the industry while ensuring the safety of its personnel, particularly within hazardous environments. [Read more...](#)



## CIVS Developed Underwater VR Lab Modules for an NSF-Funded STEM Project

CIVS researchers and students worked with The College of the Florida Keys staff and instructors to develop immersive underwater labs to enhance Marine Science and Technology courses through the NSF-sponsored DREAM STEM project. Two labs (Coral Restoration Virtual Reality and Reef Visual Census Virtual Reality) have been developed and implemented. [Read more...](#)



## AIST Ironmaking Technology Committee Meets at CIVS



Aaround 20 AIST Ironmaking Technology Committee members held their meeting at CIVS on September 26. The meeting including several presentations followed by a productive roundtable discussion on various initiatives across the ironmaking industry. [Read more...](#)

## Students Receive Research Grant Awards

Congratulations to CIVS graduate students Imran Syed, Misbahuddin Husaini Syed, and Pavan Kumar Vemula on receiving PNW Graduate Research Grants, as well as to 16 CIVS undergraduates on their PNW research grants. [Read more...](#)



## Immersive Theater Hosts Student Activities

The Immersive Theater at CIVS is host to not only CIVS events and seminars [Read more...](#), but also serves as a venue for PNW civics events [Read more...](#)



## CIVS Supports Students Through Several Events

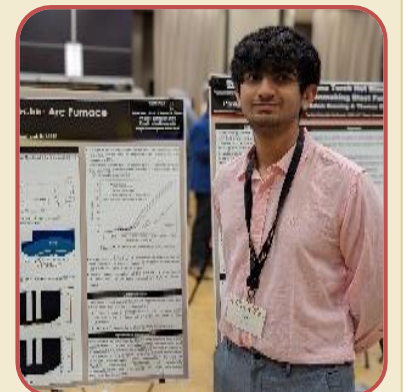
CIVS provides various opportunities for students to develop soft skills. These include CIVS orientation at the beginning of semester including research methodologies, time management, and project management. CIVS students and staff participate in AIST Midwest Chapter monthly dinner technical meetings.



CIVS also organized an outdoor retreat for team-building. CIVS prides itself on creating opportunities for student growth and success. These activities are vital to student success at CIVS. [Read more...](#)

## Student Success Story: Neel Busa

Congratulations to recent Purdue Northwest MSME graduate and CIVS research assistant Neel Busa for joining SMSVC member company ArcelorMittal as an Electric Arc Furnace Engineer (EAF). Neel worked on EAF models for his thesis and is now representing ArcelorMittal on the SMSVC EAF Project Technical Committee. He also attended the SMSVC Annual meeting in November, held at and hosted by CIVS. Neel commented: *“At my new position I hope to contribute my EAF research experience which was crucial for my employment offer. I want to be a part of ArcelorMittal’s innovation in the steel industry and the Industry 4.0 revolution.”* [Read more ...](#)





## SMSVC Meeting Showcases State-of-the-Art Computational Models



Thanks to over 50 SMSVC industry attendees for a successful Annual Meeting on November 8 and 9, hosted at PNW CIVS facility at the PNW Hammond campus. During the meeting, CIVS & SMSVC director Dr. Chenn Zhou highlighted strong academic-industry partnerships in the recent DOE grants for the Decarbonization of the Steel Industry. CIVS staff and students presented project progress in six topic areas (safety and training, Electric Arc Furnace, ironmaking including blast furnace and DRI, Refining Ladle, Continues Casting, and Reheating Furnace), followed by lively discussions. The SMSVC board and PTC members were very impressed by the level of advancement on both models and their applications. [Read more...](#)

## SMSVC Keynote on Decarbonization of Iron and Steel Making



Mr. David Forrest, Principal Technical Consultant at Nexight Group, representing the Department of Energy's Industrial Efficiency & Decarbonization Office (IEDO) delivered a keynote speech at the SMSVC Annual Meeting. His speech is titled "Opportunities for Industry-Academia-Federal Partnerships in the Decarbonization of Ironmaking and Steelmaking". [Read more...](#)



### SMSVC NOTES

**Semi-Annual Meeting**  
**April 10<sup>th</sup>-11<sup>th</sup>, 2024**

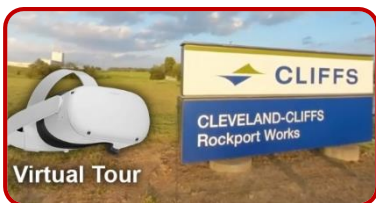
### SMSVC Accepting New Members

SMSVC is accepting new members. If interested in becoming a member, please contact [steelcons@pnw.edu](mailto:steelcons@pnw.edu)

For more information on the Consortium, visit [steelconsortium.org](http://steelconsortium.org).

## CIVS Participates in Rockport Works Family Day

On September 23, Cleveland Cliffs hosted Rockport Works Family Day at its facility, near Rockport, Indiana, which included a VR tour of the plant, created by CIVS. [Read More...](#)



## CIVS Staff Serves as Vice Chair of AIST Safety & Health Technology Committee

Congratulations to Kyle Toth, Senior Research Engineer on his official start as the Vice Chair of



AIST Safety & Health Technology Committee on September 13. He was elected at AISTech 2023. The committee is to provide and disseminate information on health and safety technologies through educational programs. [Read More...](#)

## Facts and Impacts

- \$40+ million savings for companies
- \$37,400,000+ in external grants and contracts
- 180+ external organizations collaborated with CIVS
- 420+ projects
- 690+ national and local news
- 2,030+ students employed and mentored
- 11,600+ students used CIVS for virtual labs
- 200+ Purdue faculty and staff collaborators
- 310+ student awards and grants (globally since 2011)
- 42,000+ local, national, and international visitors