



CENTER FOR INNOVATION THROUGH
VISUALIZATION & SIMULATION

PURDUE
UNIVERSITY
NORTHWEST



2200 169th Street
Hammond, IN 46323

219.989.2765
civs@pnw.edu
www.pnw.edu/civs



U.S. DOE Managers Commend CIVS-Industry Partnerships

“The collaboration between Purdue University Northwest and U. S. Steel, as well as other industry team members, demonstrates the power of partnership in tackling both domestic manufacturing competitiveness and climate change. Through the Integrated Virtual Blast Furnace (IVBF) project supported by DOE, U. S. Steel Gary Works Blast Furnace #14 operations are positively impacted through process optimization and energy efficiency improvements. At the same time, the project highlights significant potential to reduce CO₂ emissions. DOE is proud to support this important project for the steel industry and looks forward to future collaboration,” said U.S. Department of Energy (DOE) representatives Dr. John ‘Nick’ Lalena (R&D Projects Technology Manager)

and Kristen McDaniel (Technical Project Officer, Advanced Manufacturing Office), who had a productive visit on October 4th for a project review.

[Read more...](#)



SMSVC Meeting Highlights Decarbonization & Digitalization

Thanks to over 60 industry attendees for a very productive SMSVC Annual Meeting on November 9th & 10th at PNW CIVS. The meeting was opened with the CIVS & SMSVC overview by Dr. Zhou, followed by SMSVC project presentations by CIVS students and staff with ending comments and discussions by project technical committee and other industry members. A special Decarbonization Forum was held, followed by a dinner [keynote](#) on Steel Innovation and Fossil-Free Steel Production. The two-day event ended with the SMSVC Board meeting. All the SMSVC companies are committed to the goal of net zero by 2050 according to the discussions in the Decarbonization Forum. [Read more...](#)



VR Simulators for Safety & Workforce Development Presented at NADCA



John Moreland, Senior Research Scientist, presented “Virtual Reality Simulator for Die Casting Workforce Development” at the 2022 NADCA Die Casting Congress. [Read more...](#) Moreland also presented a VR Fire Safety Simulator at the NADCA Research & Development Meeting. [Read more...](#)

Research Staff Present at AIST Meeting

CVIS senior research staff Kyle Toth and John Moreland presented AR/VR training applications at a joint Safety Committee meeting held by SMA and AIST. [Read more...](#)



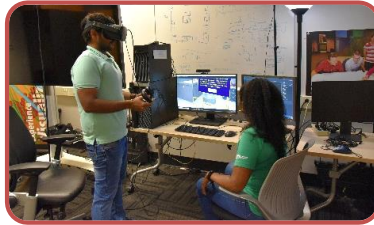
Director from Stanford SLAC Visits CVIS

Dr. Stephen Eglash, Director of the Applied Energy Division at SLAC National Accelerator Lab at Stanford, visited CVIS. [Read more...](#)



RET Program Presented at NSF Conference

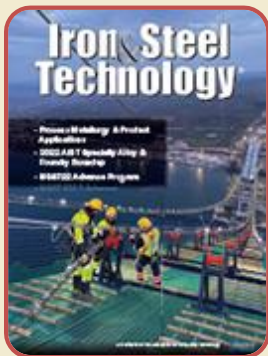
Dr. Armin Silaen presented a poster at an NSF conference, highlighting the 6-week NSF RET summer program for high school teachers at CVIS. [Read more...](#)



Talks on Decarbonization & Digitalization

Dr. Zhou delivered a virtual seminar at Argonne National Lab. [Read more...](#) She also presented “Application of Multi-Physics

Computational Simulation and Visualization” at Purdue Cyberinfrastructure Symposium. [Read more...](#)



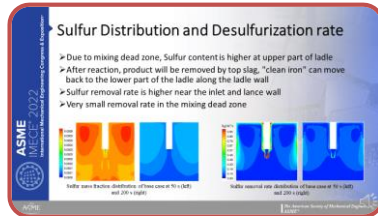
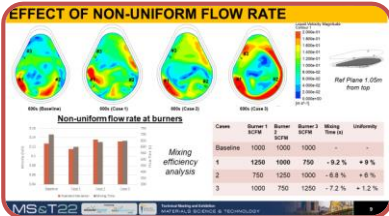
AIST Published Magazine Interviews Dr. Chenn Zhou

Iron and Steel Technology Magazine interviewed Dr. Zhou: “I was introduced to the steel industry by Dr. Pinakin Chaubal, currently CTO at ArcelorMittal in 1998 to use CFD model for predicting erosion in a blast furnace. We started with a senior design project, which was evolved to a \$1.29 million project awarded by the Indiana 21st Century Research & Technology Fund, and more projects funded by DOE and the industry. I still remembered the excitement during my first field trip with my students to the Indiana Harbor #7 Blast Furnace arranged by Mr. Wendell Carter (currently EVP, Technology, Cleveland Cliffs)...

It is especially now the most exciting time for making steel greener and smarter through decarbonization and digitalization, which is also called digital transformation, industry 4.0, or the 4th industry revolution, and decarbonization. Working in the steel industry, people can make direct impacts on the world and society. In addition, there are so many opportunities for professional development and training through AIST. Working in the steel industry, people can make direct impacts on the world and society. There are also so many opportunities for professional development and training through AIST.” [Read more...](#)

EAF & Ladle Modeling Presented at International Technical Conferences

CIVS RA Neel Busa presented “Flow Optimization of Steel Refining in an EAF” at MS&T22. [Read more...](#) Xipeng Guo, CIVS Ph.D. student, presented “Numerical Study and Validation of Hot Metal Desulfurization using Calcium Carbide in the Ladle” at 2022 IMECE. [Read more...](#)



Five Students Received Graduate School Grant Awards



Congratulations to the CIVS Students who received Graduate Research Grant Awards: Ogochukwu Duruiheme, Neel Busa, Emily Higley, Rashed Al Manasir, and Chukwunedum Uzor. [Read more...](#)

Research Ethics Discussed at Weekly Student Seminar

CIVS welcomed guest speaker Sean Courtney to discuss research ethics and the tools and procedures at Purdue. This session was invaluable to students who engage in research on various CIVS projects. [Read more...](#)



Blast Furnace Simulation Exhibit at Allegheny Discovery Center

The CIVS-developed blast furnace simulation is the first prototype to join the Steel Industry Exhibit at the Allegheny Highlands Industrial Heritage and Technology Discovery Center. [Read more...](#)



Students Gain Valuable Industry Exposure at AIST Events

CIVS research students are active to attend AIST Midwest Chapter events, including the keynote presentation by David Burritt, President and CEO of United States Steel Corporation, at the AIST Kickoff Dinner Meeting in October. [Read more...](#) and the AIST Young Professionals Night in November. [Read more...](#)

Student Success Story: Chukwunedum Uzor

Congratulations to CIVS Research Assistant (RA) Chukwunedum Uzor on receiving multiple engineering position job offers. “I encourage all future mechanical engineering graduate student to strongly consider sharpening their skills and greatly improving their knowledge in advanced engineering principles and CFD techniques by joining CIVS as graduate RA, a decision that they will leave to be grateful about. And to my fellow graduate RAs in CIVS, you have a wealth of unmatched resources in the staff, SMSVC project technical committee members and, of course, a renowned CFD professor and expert. Take advantage of the resources and you will surely weather the storm and make unimaginable impact on the global stage,” Uzor said. [Read more...](#)



SSAB Americas VP Delivers Keynote at SMSVC Meeting

Mr. Ben Kowing, VP Environment & Sustainability and Chief Technical Officer for SSAB Americas, delivered a dinner keynote speech “Steel Innovation and Fossil-Free Steel Production” at the SMSVC Annual Meeting at PNW. [Read more...](#)



SMSVC NOTES

Annual Meeting
April 12 & 13, 2023

SMSVC Accepting New Members

SMSVC is accepting new members. If interested in becoming a member, please contact steelcons@pnw.edu

For more information on the Consortium, visit steelconsortium.org.

CIVS Kicks-Off Decarbonization Project with Cleveland Cliffs

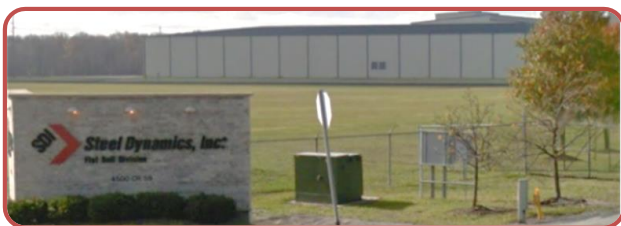
CIVS started a new collaborative greenhouse gas (GHG) mitigation with Cleveland Cliffs. The project will investigate the impact of switching from NG-PCI Co-Injection to Maximum NG on GHG emission by applying well-developed CIVS CFD models to Cliffs’ blast furnaces. CFD simulations will be performed with various operating conditions to optimize furnace performance for reducing CO₂ and increasing energy efficiency.



[Read more...](#)

Steel Dynamics Plant Trip for Smart Ladle Implementation

CIVS “Smart Ladle” team made a trip to the Steel Dynamics plant in Butler, Indiana. It was hosted by Chase Ault who has worked closely with CIVS and the SMSVC to build the award-winning Smart Ladle to use machine learning to predict and control future behavior of the steel casting process, to help improve operational efficiency and product quality. [Read more...](#)



SSAB Americas Top Executives Visits

Two groups with a total of 25 top executives at SSAB Americas visited CIVS on August 31st [Read more...](#) and October 26th [Read more...](#) respectively. Reviews and discussions were made on various projects with highlights in decarbonization projects and opportunities such as hydrogen utilization and electrification in steelmaking. The president Chuck Schmitt encouraged students and staff to continue impactful applied research using advanced technologies.



Facts and Impact (Since 2009)

- \$40+ million savings for companies
- \$35,250,000+ in external grants and contracts
- 170+ external organizations collaborated with CIVS
- 416+ projects
- 690+ national and local news
- 1,790+ students employed and mentored
- 11,550+ students used CIVS for virtual labs
- 200+ Purdue faculty and staff collaborators
- 295+ student awards and grants (globally, since 2011)
- 36,200+ local, national and international visitors