

Consortium Charter Member Enrollment Open until January 2016

CIVS has been working with the steel industry since June, 2014 to establish an industry-led Steel Manufacturing Simulation and Visualization Consortium (SMSVC) that will focus on innovative solutions to advance steel manufacturing competitiveness in the United States. **The consortium is now enrolling charter members through January 15, 2016.**

The consortium will focus on long-range technical solutions to improve eight key areas: workplace safety, energy efficiency, operational efficiency, reliability and maintenance, workforce development, environmental impacts, raw materials, and smart manufacturing. The benefits of being a member are industry-led decision making, accelerated innovation, value-added solutions, direct access to students, rapid access to research results, collaborative efforts and combined resources, and leverage from various funding agencies.

The project is funded by a NIST AMTech planning grant. Leaders and supporters of the Consortium development include: American Iron and Steel Institute, Association of Iron and Steel Technology, AK Steel, ArcelorMittal, Berry Metal, Center for Workforce Innovation, Indiana Congressional Leaders, Indiana Economic Development Corporation, NIPSCO Industries, NUCOR, SSAB, Steel Dynamics, Inc., Union Gas, U.S. Steel, and U.S. Steel Canada.

For more information, contact Doreen Gonzalez-Gaboyan by phone at +1 (219) 989 2765, via email at SteelConsortium@purduecal.edu, visit us online at www.steelconsortium.org, or visit the CIVS Booth #1346 at AISTech 2015 in Cleveland, OH, May 4-6.



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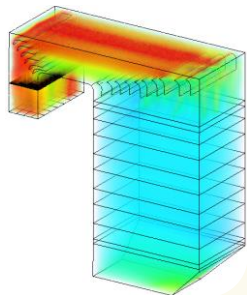


CIVS Student Wins Grand Prize in Steel Video Competition

CIVS graduate student Alrazy Sonet won the \$3,000 Grand Prize from the Association for Iron & Steel Technology Foundation "Real Steel" Video Challenge for his video submission titled "Steel: Backbone of the Universe". The challenge is an international competition in which students are challenged to create a three-minute video promoting the steel industry and branding it as a potential career field. The videos submissions were given six points of emphasis: ways that steel impacts our lives, new technologies in steelmaking, safety awareness, career opportunities for young people in high-tech positions, environmental consciousness, and energy conservation. Submissions were received from students all over the world, with five other finalists receiving prizes. Alrazy's grand prize video summarizes the modern age of steel making, including simulation, visualization, and virtual training. [Click here to view the full video.](#)



Optimization of an Air Pollution Control Device



CVIS is working with energy producer, NIPSCO, to optimize flow uniformity through duct work to help with ash buildup. In the combustion process, the nitrogen and oxygen present in the combustion air combine to form NO_x in the boiler. Selective Catalytic reduction (SCR) is a means of converting nitrogen oxides, also referred to as NO_x with the aid of a catalyst into diatomic nitrogen, N_2 , and water, H_2O . Units 7 at the NISPSO Bailly Generating Station experience problems with ash build-up on their catalyst layers. The build-up leads to higher differential pressures across the layers and increased maintenance costs for ash removal. The project will optimize flow uniformity through turns in the ductwork and across the first catalyst bed through modification in turning vanes configuration.

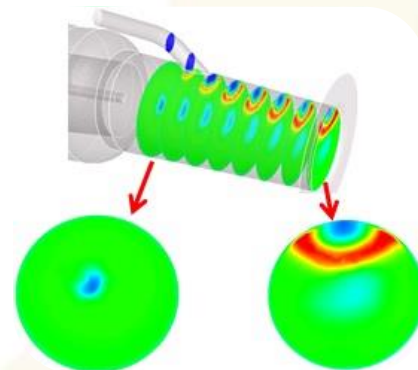
Virtual Training for Flood Prevention

CVIS has been working with Civil Engineering professors at Purdue University Calumet, University of Kentucky, Florida Atlantic University, and University of District of Columbia, to develop virtual learning / training modules for flood prevention. Funded by the National Science Foundation, the modules will be used for Civil Engineering students to experience innovative laboratory sessions for their hydrology course in the CIVIS Immersive Theater, and using more traditional 3D techniques at other sites. The modules recreated flood conditions that have occurred from Northwest Indiana's Little Calumet River and Hart Ditch. Students change conditions and examine the effects of flood prevention strategies such as adding a levee or sluice gate to help link textbook material to real world problems and improve learning.



Improvement of Combustion Efficiency for Ironmaking

CVIS has recently completed a project with AK Steel Dearborn Works researching the impact of utilizing natural gas (NG) as the carrier gas for pulverized coal injection (PCI) in an effort to improve combustion efficiency and overall operating performance. Based on results from a series of parametric studies, using industrial operating data ranges, the use of NG as the carrier gas for PCI could improve combustion efficiency by 10% without altering existing designs, with a further 9% increase possible if a design shift is considered. Additionally, CFD simulations illuminated high temperatures near the tuyere nose that are likely the cause of wear and ablation in the current configuration of the furnace. This research project determined that the use of NG as a PCI carrier also has the potential to improve blast furnace productivity by approximately 2.5%, a significant improvement upon existing rates.



Student Successes – William Walker



William Walker joined the CIVIS research group in his senior year and continued for his Master's Degree in Mechanical Engineering. Bill worked at CIVIS as one of the main graduate researchers specializing in CFD multiphase and combustion simulation. He successfully completed many projects with BP, ArcelorMittal, US Steel and NIPSCO. He also presented his research findings at international conferences and received positive feedback. During his employment at CIVIS, Bill not only demonstrated excellent research capabilities, he also developed very good communication skills interacting with industry collaborators which granted him significant advantage while he was searching for jobs. Bill accepted a design engineer position at Task Force Tips (TFT) based in Valparaiso, IN when he graduated and has continued his work there for the past 6 years developing new firefighting equipment, which provides unparalleled performance for our fire fighters across the nation and the world.

Bin Wu Presents Keynote at Surface Inspection Conference

CVIS Research Engineer, Bin Wu, was invited to give a keynote speech at the International Surface Inspection Summit (SIS). His presentation titled “Today’s Surface Inspection” covered techniques developed by CIVS to use computer simulation to identify difficult-to-reach areas on industrial equipment that have high stress and fatigue, greatly reducing the amount of time needed for surface inspections by allowing personnel to focus their efforts on the most critical areas. The SIS event was attended by representatives from over 120 companies.



CVIS Copyrights and Licensing Updates

Several CIVS projects have generated copyrighted software packages in recent years through the Purdue Research Foundation.



The Distributive Justice Game: A Classroom Exercise to Teach Principles of Justice –Dr. Howard Cohen worked with CIVS to develop this interactive software targeted for use in college philosophy courses.

3-D Computational Modeling of a Blast Furnace Hearth – CIVS developed this software model aimed at performing analysis of the hearth section of a blast furnace where liquid iron and slag accumulate during the ironmaking process.



Software for Minimization of Blast Furnace Fuel Rate by Optimizing Burden and Gas Distribution. – This software has been licensed for use in the steel industry to help increase energy efficiency and lower CO₂ emissions.

AIST Plate Rolling Technology Committee Visits CIVS



The Association for Iron and Steel Technology (AIST) Plate Rolling Technology Committee visited CIVS on March 19. Members of the AIST Plate Rolling Technology Committee come from various steel companies. During this visit, CIVS researchers and students showcased its research capabilities through examples of projects. Active discussion occurred between the AIST Plate Rolling Technology Committee members and CIVS researchers on other potential application of CIVS research capabilities in the steel industry.

CVIS Facts and Impacts

The following are some CIVS highlights since 2009.

- \$38++ million savings for companies
- 3,400+ students used CIVS for experiential learning and virtual labs
- 87 external organizations collaborated with CIVS
- 134 completed projects
- 111 technical publications
- 715 graduate and undergraduate students employed and mentored
- 75 Purdue Calumet collaborators
- 34 student awards
- 166 national and local news
- 15,200+ local, and international visitors since October 2011

Office of Institutional Advancement – Giving to CIVS



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