The AIST Foundation: Raising Awareness for the Steel Industry of Tomorrow

Dear members,

The success of the AIST Foundation is due largely to financial support from the steel industry in addition to the dedicated efforts of the Board of Trustees. We thank Fred Harnack, retired from United States Steel Corporation, for his two years of leadership as president of the Foundation. As I begin my two-year tenure as president, I look forward to continuing the good work of the AIST Foundation.

Since 2005, the AIST Foundation has awarded more than US$5.3 million in scholarships and grants to over 500 university students and teaching professionals at more than 50 different universities. During this time, more than 55 steel plants have provided internship opportunities as part of the scholarship program.

In addition to various scholarships administered by our 22 Member Chapters, the Foundation offers three levels of scholarships, all of which are for one year:

- US$3,000 for steel scholarships.
- US$6,000 for steel scholarships, which include a paid summer internship.
- US$12,000 to our top-scoring applicant.

Almost 60% of all AIST Foundation interns have secured employment in our industry, so the success rate is quite high for these particular scholarships.

The Foundation also offers several grants aimed at increasing the number of students choosing steel as a career path, including our Kent D. Peaslee Junior Faculty Award (US$35,000 per year for 3 years). While this is still a new program, industry awareness has greatly increased because of the recipients' efforts to organize plant tours and university "steel days." Our Steel Curriculum Development Grant (US$5,000 per year for 5 years) and the Steel Research & Applications Grant (US$50,000 per year) are now in their 10th year, reaching almost 30 professors at various universities. The Don B. Daily Safety Grant, recently increased from US$5,000 to US$10,000 per year, has awarded more than US$80,000 in the four years since its inception.

The Foundation also funds programs to encourage membership and conference attendance by young professionals and university faculty. For young professionals, AIST offers a complimentary one-year membership, a 50% discount on AISTech registration and special programming at AISTech. University faculty are offered a 50% registration discount to AISTech and a discounted booth in the Exhibit Hall for their university.

On 5 October, I invite you to attend the AIST Foundation University-Industry Relations Roundtable (UIRR), held at MS&T in Columbus, Ohio, USA. The UIRR fosters communication between our university network and the steel industry and provides everyone with an opportunity to engage in the dialogue.

Of course, all of these programs require a significant amount of funding. The latest Matching Funds Challenge from AIST raised almost US$1,000,000. In addition to thanking all of our corporate and personal donors, we recognize our biggest supporters: the US$100,000 Pledge Club members, ArcelorMittal, Gerdau, Nucor Corp., SSAB Americas and Steel Dynamics Inc.

The Foundation programs are featured in this issue of *Iron & Steel Technology*, and I encourage you to review the information. The AIST Foundation is making important progress toward its mission: to ensure the iron and steel industry of tomorrow will have a significant number of qualified professionals.

Steven S. Hansen
vice president and
chief technical officer,
SSAB Americas

AIST Foundation President
2015–2017

AIST Foundation Update

2015–2016 Annual Fund

The Annual Fund is the AIST Foundation's yearly campaign to strengthen the Foundation's programming through unrestricted contributions from AIST members, corporations and other supporters. The Annual Fund year begins 1 July and ends 30 June. To learn more about the charitable work of the AIST Foundation, visit AISTFoundation.org.

Multi-Year Corporate Pledges

The AIST Foundation thanks the following companies that have pledged a multi-year donation, payable in annual installments, in support of the Foundation's programs. Through this exceptional industry support, the AIST Foundation awards more than US$600,000 in scholarships and grants annually.

US$100,000

- ArcelorMittal
- Gerdau Long Steel North America
- Nucor Corp.
- SSAB North America
- Steel Dynamics Inc.

US$60,000

- United States Steel Corporation

US$50,000

- Cliffs Natural Resources
- CMC Americas
- Hatch Associates Consultants Inc.

US$20,000

- AKJ Industries Inc.
- Berry Metal Company
- CBMM North America
- MCC International Inc.
- Riverside Refractories Inc.
- Showa Denko Carbon Inc.
- SMS USA LLC

US$6,000

- D. Martin Enterprises Inc.

US$5,000

- Edw. C. Levy Co.
- ELG Haniel Metals Corp.
- Hickman, Williams & Co.
- MINTEQ International Inc.

AIST Foundation Announces 2016 Grant Recipients

The AIST Foundation offers university grants to increase the number of engineering faculty with a vested interest in the iron and steel industry, and to increase the number of engineering students electing to pursue careers in the iron and steel industry. The 2016 grant recipients are:

Steel Research & Applications Grant

- **Calixto Isaac Garcia**, University of Pittsburgh

Steel Curriculum Development Grants

- **David F. Bahr**, Purdue University
- **Gerald R. Bourne**, Colorado School of Mines
- **Kyle G. Gipson**, James Madison University

Don B. Daily Safety Grants

- **John Moreland**, Purdue University Calumet
- **Xiaopeng Ning**, West Virginia University

Kent D. Peaslee Junior Faculty Award

- **Paul G. Sanders**, Michigan Technological University
- **Laura N. Bartlett**, Texas State University
- **Bryan A. Webler**, Carnegie Mellon University

Annual Corporate Gift Clubs 2015–2016

Carnegie Circle
US$50,000+
- AIST Southeast Member Chapter

Frick Society
US$25,000–$49,999
- ArcelorMittal*
- Gerdau Long Steel North America*
- Hatch Associates Consultants Inc.*
- Nucor Corp.*
- SSAB North America*
- Steel Dynamics Inc.*

Oliver Council
US$10,000–$24,999
- AIST Philadelphia Member Chapter
- Cliffs Natural Resources*
- CMC Americas*
- United States Steel Corporation*

Schwabe Associates
US$5,000–$9,999
- AKJ Industries Inc.*
- Berry Metal Company*
- CBMM North America*
- HarbisonWalker International
- MCC International Inc.*
- Riverside Refractories Inc.*
- Showa Denko Carbon Inc.*
- SMS USA LLC*
- Tube City IMS
- Vesuvius

Morgan Guild
US$1,000–$4,999
- A.H. Tallman Bronze Co.*
- D. Martin Enterprises Inc.*
- Edw. C. Levy Co.*
- ELG Haniel Metals Corp.*
- Graycor
- Hickman, Williams & Co.*
- MINTEQ International Inc.*
- Nalco Co.
- Paul Wurth Inc.
- Primetals Technologies
- S&B Industrial Minerals
- Xtek Inc.
- Zircoa

AIST Foundation Friends
US$500–$999
- Magneco/Metrel
- Missouri Refractories Co.
- MMFX Technologies Corp.
- Stevens Engineers and Constructors
- Yates Cylinders

**These companies have made multi-year pledges.*

Make your pledge or donation today online at AISTFoundation.org or contact Lori Wharrey at lwharrey@aist.org or +1.724.814.3044. Your support is greatly appreciated!

2015–2016 Foundation Board of Trustees

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Yuan Wang, vice president of mill operations, Gerdau Long Steel North America, Tampa, Fla., USA

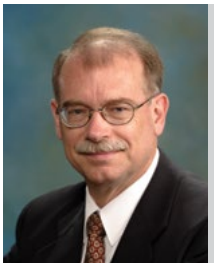
Chenn Q. Zhou, director of the Steel Manufacturing Simulation and Visualization Consortium, Purdue University Calumet, Hammond, Ind., USA

2015–2016 Board of Trustees

The AIST Foundation is a Pennsylvania-based 501(c)(3) non-profit corporation organized for charitable, education and scientific purposes that seeks to attract technology-oriented professionals to the industry by educating the public about the high-tech, diverse and rewarding nature of careers in modern steelmaking. The Foundation awards college scholarships and program grants to provide students a helping hand.

The activities, properties and affairs of the AIST Foundation are managed by a board of trustees consisting of 12 members of AIST, appointed by the AIST board of directors. In addition, the treasurer and the secretary/executive director of AIST shall serve as ex officio, non-voting members. The following pages contain biographies and photographs of the members of the 2015–2016 AIST Foundation board of trustees.

Officers



President
Steven S. Hansen, vice president and chief technical officer, SSAB Americas, Warrenville, Ill., USA

Hansen is vice president and chief technical officer for SSAB Americas, a position he has held since 2007. In this role, he has overall responsibility for all technical support activities at SSAB's North American steel plants and CTL lines, including quality assurance/quality control, applications engineering, continuous improvement, environmental, and research and development. After prior experience with Bethlehem Steel Corp., Hansen joined IPSCO in 2003 as director — technical services, U.S. steel operations. In 2004, he was named corporate director — technical services, responsible for all steel plant and tubular technical activities. When IPSCO was acquired by SSAB in July 2007, Hansen was named to his current position. He is a graduate of the Massachusetts Institute of Technology with B.S., M.S. and D.Sc. degrees in metallurgy and materials science. He is a member of AIST and a Fellow of ASM International.

Past President
Frederick T. Harnack, retired, United States Steel Corporation, Pittsburgh, Pa., USA

Harnack earned a B.S. degree in mechanical engineering in 1976 and an M.B.A. in 1982, both from the University of Pittsburgh. Harnack began his career with United States Steel Corporation in 1976 as a management trainee at the slab mill at Mon Valley Works' Edgar Thomson Plant in Braddock, Pa., USA. After serving in various operating and maintenance positions at the slab mill and the former Homestead (Pa.) Works, he became area manager for maintenance at the Edgar Thomson slab mill in 1987. Later, he moved to Mon Valley Works' Irvin Plant in West Mifflin, Pa., USA, as area manager of galvanizing. From 1990 to 1993, Harnack was the operations consultant for the PRO-TEC Coating Co. in Leipsic, Ohio, USA, a joint venture between U. S. Steel and Kobe Steel of Japan. In 1993, Harnack returned to the Mon Valley Works as the casting and rolling operating director. Harnack was named plant manager at the Edgar Thomson Plant in 1996 and advanced to general manager of Mon Valley Works in November 1999. In 2003, following the acquisition of assets of the former National Steel Corp., he was named general manager of Great Lakes Works near Detroit, Mich., USA. In 2005, Harnack was named general manager — research, with responsibility for the company's research and development activities at the Research and Technology Center in Munhall, Pa., USA. He was appointed general manager — operational excellence in August 2008, and in January 2009 was named general manager — environmental affairs. Harnack retired from U. S. Steel in 2014.

President-Elect

Kolin L. Keller, vice president — operations support for CMC Americas, CMC Steel Texas, Seguin, Texas, USA

In his current role, Keller has responsibility for engineering, energy, safety, security, environmental and capital expenditures for Commercial Metals Company's U.S. operations. Keller earned a B.S. degree in mechanical engineering from the University of Texas at Austin in 1984. As a youth, he worked in the CMC Seguin steel mill, and after graduating from college he worked for Westinghouse Electric Corp. as a field engineer in the Power Generation Division. He returned to CMC in 1988 and has worked in the Texas, Arkansas and South Carolina mills in operations and management roles in the meltshop, rolling mill, maintenance, engineering, operations support and plant management. Keller returned to the Texas mill in 2005 as the CMC Americas engineering manager. He was appointed to his current position in 2010.

Treasurer

Joseph Dzierzawski, president and chief executive officer, SMS USA LLC, Pittsburgh, Pa., USA

Since the 1 January 2015 merger of SMS Siemag and SMS Meer, Joseph Dzierzawski has been the president and CEO of SMS USA LLC, responsible for metallurgical plant building for the NAFTA market. Previously, Dzierzawski held the position of president and CEO of SMS Siemag LLC since 2006. He is a graduate of the University of Michigan with a degree in metallurgical engineering and also attended the Executive Management Program at the University of Michigan School of Business. Dzierzawski began his career as a melter at McLouth Steel in 1988, a combined BOF and EAF steelmaking operation. He moved to SMS Concast in 1990 as senior metallurgical engineer and has held several positions, including vice president of steelmaking and continuous casting at SMS Siemag LLC and also as director of sales for steelmaking and continuous casting at SMS Siemag AG in Düsseldorf, Germany.

Secretary

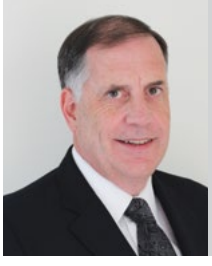
Ronald E. Ashburn, executive director and secretary, Association for Iron & Steel Technology, Warrendale, Pa., USA

Ronald Ashburn is the first executive director of the Association for Iron & Steel Technology (AIST), having served in that capacity since the organization's founding in January 2004. In his role as executive director, Ashburn is responsible for oversight of business operations and strategic planning initiatives for AIST and the AIST Foundation. He formerly served as the eighth managing director for the Association of Iron and Steel Engineers from 2002 until its merger with the Iron & Steel Society, which led to the formation of AIST. Prior to joining AISE, he worked 16 years with Mannesmann Demag, a global builder of steel plants, first joining them in 1986 as a mechanical engineer in their Continuous Casting Division. In 1996, Ashburn was appointed director of technology for steelmaking and casting, and in 1997 he became vice president — casting and hot rolling. In 1999, SMS and Mannesmann Demag merged to form SMS Demag, where he served as vice president — operations for their Steelmaking and Casting Division in Pittsburgh, Pa., USA. Ashburn received his B.S. degree in mechanical engineering from the University of Pittsburgh (1987) and participated in metallurgical process training at the University of British Columbia (1987) and global business management training at the University of Virginia (1998). He serves on the board of directors for VisitPittsburgh and is a member of its executive committee.

Trustees

David L. Britten, senior vice president and chief technology officer, United States Steel Corporation, Pittsburgh, Pa., USA

David L. Britten was named senior vice president and chief technology officer for United States Steel Corporation in April 2014. He is responsible for the expansion of the company's worldwide innovation, technology, engineering, and research and development of products, services and solutions. Britten joined U. S. Steel in May 2011 to serve as vice president — tubular technology and business development, overseeing energy services and tubular technology development efforts, including premium connections, as well as other business development activities. In July 2013, Britten was appointed senior vice president — tubular operations. Prior to joining U. S. Steel, Britten served as executive vice president of Sweden-based steelmaker SSAB and president of SSAB's Americas division. He began his career in the steel industry in 1985 when he joined the former IPSCO as a product development engineer and began his tubular experience as a sales representative in Calgary, Alta., Canada. At IPSCO, he served in a variety of management roles. From 1999 until 2006, Britten served as vice president and general manager for IPSCO's Tubular Division. After SSAB acquired IPSCO in 2007, he was named senior vice president — steel for the company's North American division. A native of Sydney, N.S., Canada, Britten earned a B.Eng. degree in mechanical engineering from the Technical University of Nova Scotia (now Dalhousie University) in 1983. He obtained an M.S. degree in mechanical engineering from Queen's University in Kingston, Ont., Canada, in 1985. During his career, Britten has been active in several industry trade associations, including serving on the boards of the American Iron and Steel Institute, the Steel Manufacturers Association and the Metals Service Center Institute.



William H. Emling, vice president — Steelmaking and Continuous Casting Division, SMS USA LLC, Pittsburgh, Pa., USA

William H. Emling received his B.S. degree in metallurgical and material science engineering from Case Western Reserve University in 1979. He is a Fellow of the Weatherhead Graduate School of Management at Case Western Reserve University, and received executive management training at the University of Virginia's Darden School of Management. He began his career with National Steel Corp. (now U. S. Steel) in Granite City, Ill., USA, before moving on to LTV Steel. At LTV, he spent many years as a department manager in continuous casting research and later in operations and technology management. After 20 years as a steel producer, he joined the SMS group in 1999. Emling worked for seven years with SMS Millcraft as a vice president and plant manager; he joined SMS Siemag in 2006 in his current role. Emling has been a very active member of AIST and its predecessor organizations, having served as the chairman of the Iron & Steel Society's Steelmaking Division and AISE's Continuous Casting Operating Committee. He has served on the board of directors for both ISS and AIST. He is currently a member of four Technology Committees and an instructor for the annual Continuous Casting Specialty Training Conference. He has published more than 35 technical papers, twice being awarded the Charles H. Herty Jr. Award, and also winning the Robert W. Hunt Award. Emling is currently a member of the Pittsburgh Member Chapter and a member of the board of the Case Alumni Association.

Terry G. Fedor II, executive vice president, U.S. Iron Ore Operations, Cliffs Natural Resources Inc., Cleveland, Ohio, USA

Terry G. Fedor has served as executive vice president — United States iron ore operations at Cliffs Natural Resources since 2014, and before that served as vice president — United States iron ore operations from 2012. Prior to that, he held the position of vice president — metallics beginning in 2011. He previously held positions of vice president and general manager of ArcelorMittal Cleveland since March 2005, responsible for all day-to-day operations. Fedor was also responsible for ArcelorMittal facilities located in Warren, Ohio; Weirton, W.Va.; Monessen, Pa.; and Lackawanna, N.Y., USA. He held the positions of senior division manager — maintenance and hot rolling at ISG Weirton and division manager — maintenance, engineering and utilities at ISG Cleveland, both predecessor companies of ArcelorMittal. Prior to joining ISG, he served as area manager — hot mill maintenance at the Cleveland Works of LTV Corp. from 1999 to 2002. He also worked as a mechanical engineer for Iron Dynamics Inc. from 1996 to 1999. Fedor began his steel career at LTV Corp. in a co-op program in 1986 and held various management positions of increasing responsibility in the iron producing, hot strip mill and finishing departments. Fedor earned a bachelor's degree in mechanical engineering from the University of Akron in Akron, Ohio, USA, and an M.B.A. from John Carroll University in Cleveland, Ohio, USA.

Eric D. Hauge, vice president and general manager, ArcelorMittal Cleveland and ArcelorMittal Warren, Cleveland, Ohio, USA

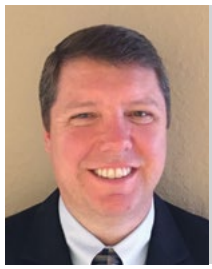
Eric D. Hauge has served as vice president and general manager of ArcelorMittal Cleveland Flat Carbon Americas (FCA) since June 2011. He is also responsible for the ArcelorMittal facility located in Warren, Ohio, USA. Hauge has more than 35 years of experience in the steel industry, all of which has been at the Cleveland facility. In 1975, he joined what is today the ArcelorMittal Group and has since held various positions of increasing leadership. Prior to becoming vice president and general manager of ArcelorMittal Cleveland, he was the division manager of the facility's iron producing division, where he earned recognition within the industry and the ArcelorMittal Group as an expert in blast furnace operations. Hauge holds a B.S. degree in engineering from Cleveland State University and attended the University of Michigan Executive Program. He is engaged in several industry and civic initiatives. He currently serves on the board of directors of the Ohio Steel Council and is a past president of the Eastern States Blast Furnace and Coke Oven Association.

Scott J. Laurenti, melt/cast manager, Nucor Steel–Utah, Plymouth, Utah, USA

Scott J. Laurenti earned a B.S. degree in metallurgical engineering from the South Dakota School of Mines and Technology in 1993 while working at the largest underground gold mine in the U.S. at the time, Homestake Gold Mine. Laurenti worked there from 1989 to 1993 as a lead-man in a 5,000-foot-deep vertical shaft. After graduation, he went to work for Nucor Corp., starting his career at Vulcraft-Utah. Laurenti worked for five different Nucor divisions — Vulcraft-Utah, Nucor Steel–South Carolina, Nucor Steel–Utah, Nucor Steel–Texas and Nucor Steel Kankakee Inc. — and moved seven times across the country for different levels of responsibility. He has held several positions, including several plant and shop metallurgist roles. Of his 22 years with Nucor, eight have been spent as a melting and casting manager, with the most recent three in Kankakee, Ill., USA. Laurenti recently returned to Nucor Steel–Utah, where he is currently melt/cast manager.

Theodore F. Lyon, managing director, Hatch Associates' Iron and Steel Business Unit, and president, Hatch Associates Consultants Inc., Pittsburgh, Pa., USA

Theodore F. Lyon is managing director for Hatch Associates' Iron and Steel Business Unit and president of Hatch Associates Consultants Inc., Pittsburgh, Pa., USA — the U.S.-based unit of the Hatch Group, headquartered in Mississauga, Ont., Canada. He is responsible for client development, project operations and business performance associated with Hatch's technical consulting, engineering and project delivery services to the iron and steel industry worldwide. In addition, Lyon leads Hatch's U.S. business, including metals and mining, infrastructure and energy. Lyon began his career with Conoco Inc. in the petroleum refining and petrochemicals business and held various maintenance, operations, and project management positions in Maryland, Louisiana, Mississippi and Texas. In 1990, he joined Eichleay Engineers and progressed through various management positions to vice president — business development before joining the Hatch Group in 2002. Lyon earned both his B.S. degree in mechanical engineering (1980) and M.B.A. (1993) from the University of Pittsburgh and is a registered professional engineer in Pennsylvania, New York, Michigan, Mississippi and Louisiana.



Jerold P. Neleson Jr., executive vice president, AKJ Industries, Ft. Myers, Fla., USA

Jerold P. Nelesen Jr. graduated from Purdue University West Lafayette in 1990 with a bachelor's degree in electrical engineering. Prior to joining AKJ, Nelesen joined Phillips Petroleum as a sales management trainee at its plastics research and technical development facility located in Bartlesville, Okla., USA. In 1991, Nelesen joined Betz Industrial, currently known as GE Betz, as a technical sales representative to assist in developing its Power Division, nuclear and fossil fuel, and was eventually promoted to account manager in Betz's Entec Division. In 1997, Nelesen joined National Recovery Systems (NRS) as manager, market development. NRS was purchased by Harsco Corp. in 2005 and became part of Harsco Metals Division. Nelesen advanced through increasingly responsible positions and was eventually appointed corporate account executive, responsible for managing Harsco's commercial agreements, primarily with United States Steel Corporation, AK Steel Corp.

and Severstal. In 2010, Nelesen joined AKJ Industries as Western regional manager of its chemical division. In 2012, Nelesen was promoted to his current position, executive vice president of AKJ Industries, with his primary focus on the company's existing steel and hydrocarbon operating divisions and all new expansion opportunities. In 2001, Nelesen was selected by the Iron & Steel Society (ISS) president to serve on AIME's Robert Earll McConnell Award committee and was appointed committee chairman in 2003. He has been active member of AIST and its affiliates since his introduction to the steel industry in 1997 and was recognized by the ISS as a young leader in 1999 while serving on several technical committees. Over the years, Nelesen has participated in the AIST Oxygen Steelmaking, Ironmaking and Material Handling Technology Committees; Iron Producing Operating Committee Papers Subcommittee; and Pittsburgh and Midwest Member Chapters. He served as a session chair at AISTech for the Ironmaking Technology Committee from 2004 to 2009.

Yuan Wang, vice president of mill operations, Gerdau Long Steel North America, Tampa, Fla., USA

Yuan Wang serves Gerdau Long Steel North America as vice president of mill operations. In this role, he is responsible for ensuring that all mills across the company operate efficiently and improve continuously. He is also in charge of the integration and implementation of the Gerdau Business System and the development of quality systems. Wang has more than 20 years of experience within Gerdau. His career started in Riograndense, Brazil, in March 1987. He has worked across a broad range of steel operations, including scrap, meltshop, casting and refractory operations, and numerous business operation support systems. Prior to joining the executive team of Gerdau Long Steel North America, Wang held various senior-level positions, including senior process engineer, plant operations manager, vice president and general manager of the company's Manitoba Rolling Mill, and executive director and chief representative for Gerdau's special steel operations in Shanghai, China. Wang has worked for Gerdau in operations in Brazil, Canada, China and the U.S. He is fluent in English, Portuguese and Mandarin Chinese. Wang is a graduate of Universidade Federal do Rio Grande do Sul, where he majored in metallurgical engineering.

Chenn Q. Zhou, director of the Steel Manufacturing Simulation and Visualization Consortium, Purdue University Calumet, Hammond, Ind., USA

Chenn Zhou received her Ph.D. in mechanical engineering from Carnegie Mellon University and her B.S. and M.S. degrees from Nanjing University of Aeronautics and Astronautics, China. She joined Purdue University Calumet in 1994. She has more than 30 years of experience in computational fluid dynamics, multi-phase reacting flows, combustion and air pollution control. She has received more than US$18 million in research grants since 1995 and has collaborated with more than 90 companies and organizations. In 2009, she established the Center for Innovation Through Visualization and Simulation (CIVS). Currently, she is working with steel industry to form a Steel Manufacturing Simulation and Visualization Consortium (SMSVC) and to develop a technology road map for the Consortium. Zhou has two patents and has published more than 300 technical papers. She has received numerous awards, including the R&D 100 Award in 2004, the AISI Medal Award in 2005 and the AIST J. Keith Brimacombe Memorial Lecture Award in 2010. Zhou has been a Fellow of the American Society of Mechanical Engineers (ASME) since 2003. She has served as chair of the Fire and Combustion Committee in the Heat Transfer Division of ASME and organized a number of national and international technical conferences and sessions. Zhou is also a professor by courtesy at the School of Mechanical Engineering, Purdue University West Lafayette.

2015–2016 AIST Foundation Scholarship Winners

The AIST Foundation awards academic scholarships on an annual basis to talented and dedicated students to encourage the pursuit of careers within iron- and steel-related industries. Unless noted, scholarships will be granted to full-time undergraduate students with a strong interest in a career in the iron and steel industry and majoring in the field of engineering or engineering technology; metallurgy; materials science; chemical, electrical, mechanical, industrial, computer science or environmental engineering at an accredited U.S. college or university.

AIST Steel Internship Scholarships

It is the program's goal that these scholarships and summer internships provide incentive for students to become involved in the steel industry. Each recipient will receive a paid summer internship with a North American steel company during the summer immediately following selection and, providing there is satisfactory performance by the student both academically and in the internship, be awarded funding toward tuition following the internship. Full-time university students may apply each year.

Steel Premier Internship Scholarship

US$10,000 one-year scholarship

This scholarship was established in 2008. The scholarship is awarded to the top-scoring applicant of all applications received.

The recipient of the 2015–2016 Steel Premier Internship Scholarship is **Dustin A. Arvola**, from Churubusco, Ind., USA. Dustin is a senior mechanical engineering major at Trine University. See Dustin's report on his internship experience on page 42.

Steel Internship Scholarship

US$5,000 one-year scholarships

These scholarships were established in 2005. Recipients of the 2015–2016 FeMET Scholarships are as follows:

- **Nicklas C. Barber**, from Constantine, Mich., USA. Nicklas is a senior mechanical engineering major at Michigan Technological University. He completed his internship at ArcelorMittal Indiana Harbor, Indiana Harbor, Ind., USA. See Nicklas' report on his internship experience on page 42.
- **Taylor R. Brown**, from Pleasant Grove, Ala., USA. Taylor is a senior materials science and engineering major at University of Alabama at Birmingham. He completed his internship at U.S. Pipe, Bessemer, Ala., USA.
- **Zachary M. Corey**, from Sandy Hook, Va., USA. Zachary is a junior mechanical engineering major at Virginia Tech. He completed his internship at Steel Dynamics Inc. – Roanoke Bar Div., Roanoke, Va., USA. See Zachary's report on his internship experience on page 42.
- **Mark C. Emmendorfer**, from Union, Mo., USA. Mark is a junior metallurgical engineering major from Missouri University of Science and Technology. He completed his internship at Spokane Industries, Spokane Valley, Wash., USA. See Mark's report on his internship experience on page 43.
- **Cameron J. LaPresta**, from Festus, Mo., USA. Cameron is a senior metallurgical engineering major at Missouri University of Science and Technology. He completed his internship at MCC International, Pittsburgh, Pa., USA. See Cameron's report on his internship experience on page 43.
- **Emily B. Mitchell**, from Golden, Colo., USA. Emily is a junior metallurgical and materials engineering major at Colorado School of Mines. She completed her internship at Nucor Steel Memphis Inc., Memphis, Tenn., USA.
- **Joseph L. Ogea**, from Bettendorf, Iowa, USA. Joseph is a junior materials science and engineering major at Virginia Tech. He completed his internship at SSAB, Muscatine, Iowa, USA. See Joseph's report on his internship experience on page 43.


Arvola


Barber

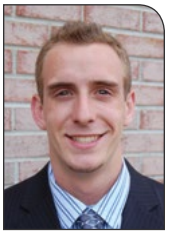

Brown


Corey


Emmendorfer


LaPresta


Ogea


Rigby


Sedrak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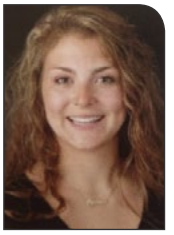
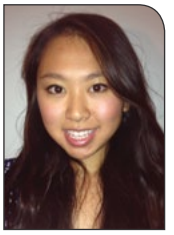

Weiss


Zhang


McIntyre

- **Tyler S. Rigby**, from Pittsburgh, Pa., USA. Tyler is a junior mechanical engineering major at The Pennsylvania State University. He completed his internship at Nucor Steel–Nebraska. See Tyler's report on his internship experience on page 44.
- **David G. Sedrak**, from Schererville, Ind., USA. David is a senior mechanical engineering major at Purdue University Calumet. He completed his internship at ArcelorMittal Burns Harbor. See David's report on his internship experience on page 44.
- **Aaron S. Weir**, from Harveys Lake, Pa., USA. Aaron is a junior materials science and engineering major at Virginia Tech. He completed his internship at AK Steel Corp. – Butler Works, Butler, Pa., USA. See Aaron's report on his internship experience on page 44.
- **Sydney G. Weiss**, from Glencoe, Ill., USA. Sydney is a junior environmental and ecological engineering major at Purdue University. She completed her internship at ArcelorMittal Burns Harbor. See Sydney's report on her internship experience on page 45.
- **Maggie L. Zhang**, from Tuscaloosa, Ala., USA. Maggie is a senior mechanical engineering major at the University of Alabama. She completed her internship at Nucor Steel Tuscaloosa Inc., Tuscaloosa, Ala., USA. See Maggie's report on her internship experience on page 45.

AIST Steel Scholarships

Scholarships will be granted to full-time students enrolled at an accredited North American college or university, with a strong interest in a career in the iron and steel industry. Qualifying majors are materials science, metallurgical, chemical, electrical, mechanical, industrial, environmental and computer engineering or engineering technology. University freshmen, sophomores, juniors and graduate students may apply.

AIST Willy Korf Memorial Fund

Four US$3,000 one-year scholarships

This scholarship was established by Korf Lurgi Steeltec Inc. to honor the late Willy Korf, founder of the Korf Group and a well-known promoter/developer of innovative technology. The 2015–2016 winners are:

- **Breanna N. McIntyre**, from Stoney Creek, Ont., Canada. Breanna is a senior software engineering major at University of Western Ontario.
- **Griffin D. Miller**, from Dearborn, Mich., USA. Griffin is a sophomore electrical engineering major at University of Michigan.
- **Benjamin A. Paren**, from Naperville, Ill., USA. Benjamin is a senior materials science and engineering major at Carnegie Mellon University.
- **Andrew R. Wunderlich**, from Rapid City, S.D., USA. Andrew is a junior metallurgical engineering major at South Dakota School of Mines and Technology.

AIST Ronald E. Lincoln Memorial Scholarship

Three US$3,000 one-year scholarships

This scholarship was established by Chaparral Steel as a tribute to Ronald Lincoln and is awarded to individuals who best exemplify the qualities of leadership and innovation for which Mr. Lincoln was so well known throughout his career. The 2015–2016 recipients are:

- **Jordy Lemus**, from Reading, Pa., USA. Jordy is a junior materials science and engineering major at The Pennsylvania State University.
- **Jacob D. Locke**, from Madison, Ala., USA. Jacob is a junior electrical engineering major at Auburn University.
- **William A. Roach**, from Statesboro, Ga., USA. William is a sophomore materials and metallurgical engineering major at University of Alabama.


Miller


Paren


Wunderlich


Lemus


Locke


Roach

AIST Benjamin F. Fairless Scholarship (AIME)

Two US$3,000 one-year scholarships

This scholarship was established in 1954 by a grant from United States Steel Corporation in memory of its longtime chairman of the board. The 2015–2016 recipients are:

- **Erik S. Bain**, from Savage, Minn., USA. Erik is a senior materials science and engineering major at Michigan Technological University.
- **Andrew J. Knueven**, from Bowling Green, Ohio, USA. Andrew is a junior mechanical engineering major at Kent State University.

AIST William E. Schwabe Memorial Scholarship

One US$3,000 one-year scholarship

This scholarship was established in 2005 in collaboration with the Steel Manufacturers Association (SMA) to commemorate the life and industry service of Mr. Schwabe, a pioneer in the application of electrical engineering technology to the advancement and refinement of electric arc furnace steelmaking.

The recipient of the 2015–2016 William E. Schwabe Memorial Scholarship is **Gregory P. Newman**, from Sarver, Pa., USA. Gregory is a sophomore mechanical engineering major at Gannon University.

AIST Engineering Scholarships

One-year scholarships

This scholarship was established in 2015 and will be awarded at the discretion of the AIST Foundation Scholarship Committee based on the quality of applications received and the funding available. The 2015–2016 recipients are:

- **William J. Howard**, from Rochester, Pa., USA. William is a junior materials engineering major at Rensselaer Polytechnic Institute.
- **Mark Mazzucco**, from Mesa, Ariz., USA. Mark is a junior metallurgical engineering major at South Dakota School of Mines and Technology.
- **Dustin C. Read**, from New Braunfels, Texas, USA. Dustin is a senior technology management major at Texas State University.
- **Mary (Maggie) M. Saylor**, from Millsboro, Del., USA. Maggie is a junior metallurgical and materials engineering major at University of Alabama.
- **Lydia R. Yocum**, from Odessa, Fla., USA. Lydia is a senior chemical engineering major at University of South Florida.

AIST Smith Graduate Scholarship (AIME)

Up to US$6,000 one-year scholarship

This scholarship was established by the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) in 1967 to honor Henry DeWitt Smith's contributions to the mining industry. The 2015–2016 recipients are:

- **Saikat Chatterjee**, from Toronto, Ont., Canada. Saikat is a materials science and engineering major who is pursuing his graduate degree at the University of Toronto.
- **April D. Pitts**, from Northport, Ala., USA. April is a metallurgical engineering major who is pursuing her graduate degree at the University of Alabama.

AIST David H. Samson Scholarship

One US$3,000 one-year scholarship

Selected by the AIST Northern Member Chapter, this scholarship was established to honor David H. Samson, past vice president of engineering at Dofasco and past president of AISE. The 2015–2016 recipient is **Joshua A. Feather**, from Hamilton, Ont., USA. Joshua is a junior materials engineering major at McMaster University.


Bain


Newman

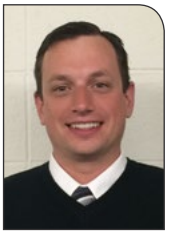

Yocum

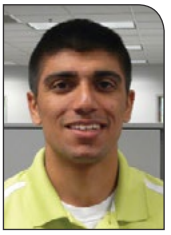

Chatterjee


Pitts


Feather


Finnen


Gancarz


Ghuman


Sidock


Tower


LaRoy


Leffew

Member Chapter Scholarships

AIST Birmingham Member Chapter Scholarships

Three US$2,000 one-year scholarships

- **Garret H. Finnen**, from Tuscaloosa, Ala., USA. Garret is a junior metallurgical engineering major at University of Alabama.
- **Jacob D. Locke**, from Madison, Ala., USA. Jacob is a junior electrical engineering major at Auburn University. He is the son of AIST member Christopher Locke of Nucor Steel–Decatur LLC. Jacob is pictured on page 37.
- **Maggie L. Zhang**, from Landale, Pa., USA. Maggie is a junior mechanical engineering major at University of Alabama. Maggie is pictured on page 36.

AIST Detroit Member Chapter Scholarship

- Judith A. Quinn Scholarship

  Two scholarships of US$5,000 and two scholarships of US$2,500

  - **Jonathan J. Gancarz**, from Taylor, Mich., USA. Jonathan is a junior mechanical engineering major at Wayne State University. He is the son of AIST member James E. Gancarz of U. S. Steel – Great Lakes Works.
  - **Karan Ghuman**, from New Boston, Mich., USA. Karan is a junior mechanical engineering major at Michigan State University. He is the son of AIST member Harvinder Ghuman of U. S. Steel – Great Lakes Works.
  - **Valerie C. Sidock**, from Brighton, Mich., USA. Valerie is a senior civil engineering major at Michigan Technological University. She is the daughter of AIST member William A. Sidock of Sidock Group Inc.
  - **Jordan T. Tower**, from Waterford, Mich., USA. Jordan is a freshman mechanical engineering major at Oakland University. He is the son of AIST member Galen T. Tower of Sidock Group Inc.

AIST Globe-Trotters Member Chapter Scholarships

Four US$2,500 one-year scholarships

- **Patrick M. LaRoy**, from Leo, Ind., USA. Patrick is a junior mechanical engineering major at Purdue University. He is the son of AIST member Robert R. LaRoy of Steel Dynamics Inc. – Flat Roll Group Butler.
- **Anna K. Leffew**, from Commerce, Ga., USA. Anna is a sophomore engineering major at University of Georgia. She is the daughter of AIST member Joseph P. Leffew of MINTEQ International Inc.
- **Jordan M. Reed**, from Hebron, Ind., USA. Jordan is a senior accounting major at Purdue University Calumet. She is the daughter of AIST member Dennis Reed of Modern Machine & Grinding Inc.
- **Morgan E. Richards**, from Menomonee Falls, Wis., USA. Morgan is a freshman computer science major at University of Wisconson–Madison. She is the daughter of AIST member Jeffrey T. Richards of Charter Steel – Saukville.

AIST Midwest Member Chapter Scholarships

- AIST Don Nelson Scholarship

  One US$3,000 one-year scholarship

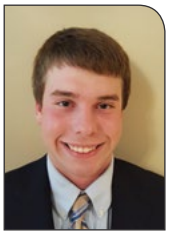
  Administered and funded by the AIST Midwest Member Chapter on behalf of the AIST Foundation, this scholarship was established for area students to prepare them for a career in engineering.

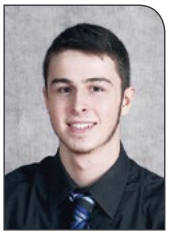

Reed


Richards


Dutler


Scarsella


Boehmer


Snyder


Chanez


Gallagher


Cooke


Jackson


Dolehide


Speranza


Murphy


Hendrickson

The recipient of the 2015 Don Nelson Scholarship is **Jacob M. Dutler**, from Countryside, Ill., USA. Jacob is a sophomore materials science and engineering major at University of Illinois at Urbana-Champaign. He is the son of AIST member Mark A. Dutler of ArcelorMittal USA.

- Betty McKern Award for Women in Engineering
  One US$3,000 one-year scholarship

  The recipient of the 2015 Betty McKern Award is **Emily J. Scarsella**, from Valparaiso, Ind., USA. Emily is a junior mechanical engineering major at Valparaiso University. She is the daughter of AIST member Mark Scarsella of ArcelorMittal Burns Harbor.

- Mel Nickel Award for Engineering
  One US$3,000 one-year scholarship

  The recipient of the 2015 Mel Nickel Award is **Michael R. Boehmer**, from St. Charles, Ill., USA. Michael is a sophomore architectural engineering and construction management major at Milwaukee School of Engineering. He is a member of AIST.

- Jack Gill Award for Engineering
  One US$3,000 one-year scholarship

  The recipient of the 2015 Jack Gill Award is **Ross A. Snyder**, from Platte City, Mo., USA. Ross is a junior mechanical engineering major at University of Missouri at Kansas City. He is a member of AIST.

- Western States Award
  One US$3,000 one-year scholarship

  Katherine M. Chanez, from Bettendorf, Iowa, USA. Katherine is a sophomore English major at University of Iowa. She is the daughter of AIST member Raymond G. Chanez of SSAB Americas.

- Midwest Member Chapter Scholarship
  One US$3,000 one-year scholarship

  The recipient of the 2015 Midwest Member Chapter Scholarship is **Patrick C. Gallagher**, from Valparaiso, Ind., USA. Patrick is a sophomore structural engineering major at Marquette University. He is the son of the late Shawn C. Gallagher, who was an AIST member.

- Engineering Scholarship
  Two US$1,500 one-year scholarships
  - **David W. Cooke**, from Bettendorf, Iowa, USA. David is a freshman engineering major at Iowa State University. He is the son of AIST member Michael A. Cooke of SSAB Iowa Inc.
  - **Emily F. Jackson**, from Valparaiso, Ind., USA. Emily is a freshman engineering major. She is the daughter of AIST member Timothy T. Jackson of Harsco Metals Americas.

- Non-Engineering Scholarships
  Two US$1,500 one-year scholarships
  - **Logan G. Dolehide**, from Crestwood, Ill., USA. Logan is a freshman business major. He is the son of AIST member William A. Dolehide of Emerson Power Transmission.
  - **Thomas A. Speranza**, from Munster, Ind., USA. Thomas is a freshman choral music education major. He is the son of AIST member Michael B. Speranza of B.E. Speranza Inc.

- Tom Cipich Non-Engineering Scholarship
  One US$1,500 one-year scholarship

  The recipient of the 2015 Tom Cipich Non-Engineering Scholarship is **James F. Murphy**, from Munster, Ind., USA. James is a freshman psychology major at Indiana University. He is the son of AIST member Terrence Murphy of ArcelorMittal Riverdale.

- Technology Scholarship
  One US$1,500 one-year scholarship

  The recipient of the 2015 Technology Scholarship is **Mitchell J. Hendrickson**, from Crown Point, Ind., USA. Mitchell is a freshman engineering major at Purdue University. He is the son of AIST member James J. Hendrickson of ArcelorMittal USA.

- Computer Technology Scholarship
  One US$1,500 one-year scholarship

  The recipient of the 2015 Computer Technology Scholarship is **Thomas J. Abbott**, from Whiting, Ind., USA. Thomas is a junior electrical engineering major at Valparaiso University. He is the son of AIST member Michael Abbott of Abbott's Printing Inc.

- Material Advantage Scholarship
  One US$1,000 one-year scholarship

  The recipient of the 2015 Material Advantage Scholarship is **Austin T. Otto**, from Maplewood, Minn., USA. Austin is a sophomore mechanical engineering major at University of St. Thomas. He is a member of AIST.

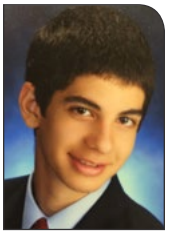
AIST Northeastern Ohio Member Chapter – Canton Section Scholarships

- John Klusch Scholarship
  Two US$2,000 and one $1,000 one-year scholarships
  - **Paul R. Fox**, from Louisville, Ohio, USA. Paul is a junior aviation engineering major at The Ohio State University.


Abbott


Otto


Shortman


C. Ahlborg


Donohue

He is the son of AIST member Michael D. Fox of Magnesita Refractories.

- **Patrick M. LaRoy**, from Leo, Ind., USA. Patrick is a junior mechanical engineering major at Purdue University. He is the son of AIST member Robert R. LaRoy of Steel Dynamics Inc. – Flat Roll Group Butler. Patrick is pictured on page 38.
- **Paul J. Shortman**, from Hudson, Ohio, USA. Paul is a sophomore data analytics major at The Ohio State University. He is the son of AIST member Glenn E. Shortman of GES Process Technologies Inc.

• A.B. Glossbrenner Scholarship

Three US$2,000 and one US$1,000 one-year scholarships

- **Carl B. Ahlborg**, from Richfield, Ohio, USA. Carl is a sophomore materials science and engineering major at The Ohio State University. He is the son of AIST member Kevin C. Ahlborg of ArcelorMittal Cleveland.
- **Marc Ahlborg**, from Richfield, Ohio, USA. Marc is a senior aeronautical engineering major at The Ohio State University. He is the son of AIST member Kevin C. Ahlborg of ArcelorMittal Cleveland.
- **Timothy M. Donohue**, from North Olmsted, Ohio, USA. Timothy is a junior electrical engineering major at The Ohio State University. He is the son of AIST member Michael J. Donohue of R.T. Patterson Co. Inc.
- **Noah A. Persson**, from Girard, Ohio, USA. Noah is a sophomore environmental engineering major at the University of Colorado–Boulder. He is the son of AIST member Thomas Persson of CMI Industry Americas Inc.

• University of Akron Scholarship

One US$1,000 one-year scholarship

Benjamin J. Waters, from Akron, Ohio, USA. Benjamin is a junior electrical engineering major at the University of Akron.

• Youngstown State University Scholarship

One US$1,000 one-year scholarship

Jared L. Fink, from Austintown, Ohio, USA. Jared is a junior mechanical engineering major at Youngstown State University.

AIST Northwest Member Chapter Scholarship

One US$3,000 one-year scholarship

- **Ryan W. Chin**, from Portland, Ore., USA. Ryan is a freshman mechanical engineering major at Oregon State University. He is the son of AIST member Michael N. Chin of EVRAZ Portland.

AIST Pittsburgh Member Chapter Scholarships

• Lawrence G. Maloney Scholarship

One US$2,500 one-year scholarship

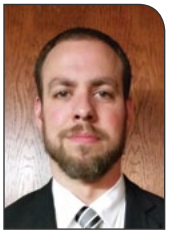
The recipient of the 2015 Lawrence G. Maloney Scholarship is **Grace M. Yee**, from San Francisco, Calif., USA. Grace is a junior materials science and engineering major at Carnegie Mellon University. She is a member of AIST.

• AIST Pittsburgh Member Chapter Scholarship

Two US$2,500 one-year scholarships

- **Heather G. Bowman**, from Palo Alto, Calif., USA. Heather is a sophomore materials science and engineering major at Carnegie Mellon University. She is a member of AIST.
- **Hannah C. McGinley**, from Sewickley, Pa., USA. Hannah is a freshman engineering major at The Pennsylvania State University. She is the daughter of AIST member Mark J. McGinley of Hall Industries Inc.


Persson


Waters


Chin


Yee


Bowman


McGinley


Giacobazzi


Kuzmicky


Smith


Zimmerman


Hunter

AIST San Francisco Member Chapter Scholarship

Two US$1,500 one-year scholarships

- **Morgan A. Giacobazzi**, from Clayton, Calif., USA. Morgan is a freshman kinesiology major at California Polytechnic State University–San Luis Obispo. She is the daughter of AIST member Lynnette A. Giacobazzi of USS-POSCO Industries.
- **Matthew P. Kuzmicky**, from Brentwood, Calif., USA. Matthew is a freshman biological sciences major at University of California–Davis. He is the son of AIST member Timothy D. Kuzmicky of USS-POSCO Industries.

AIST Southeast Member Chapter Scholarship

- Gene Suave Scholarship

  Two US$3,500 one-year scholarships
- **Patrick T. Smith**, from Lexington, S.C., USA. Patrick is a sophomore engineering major at Clemson University. He is the son of AIST member Thomas Smith of CMC Steel South Carolina.
- **Alex R. Zimmerman**, from Camden, S.C., USA. Alex is a sophomore mechanical engineering major at the University of South Carolina. He is the son of AIST member Tod R. Zimmerman of NSK Americas.

AIST Southern California Member Chapter Scholarship

Two US$1,500 one-year scholarships

- **Saundra (Liz) E. Hunter**, from Redlands, Calif., USA. Liz is pursuing her M.B.A. at University of California–Riverside.
- **Rukmini A. Ravi**, from Claremont, Calif., USA. Rukmini is a freshman engineering major at Chaffey College. She is the daughter of AIST member Vilupanur A. Ravi of California State Polytechnic University – Pomona.

Endowment Scholarships

AIST Farrington Memorial Scholarship Fund

Awarded and administered by the Rose-Hulman Institute of Technology, this scholarship was established by AISE in 1965 in honor of James Farrington, founding president of the Association of Iron and Steel Electrical Engineers (AISEE), 1907, for engineering students enrolled in the Rose-Hulman Institute of Technology. The 2014–2015 recipients are:

- **Nicholas M. Duncan**
- **Katherine H. Stengher**

AIST Madsen Scholarship Fund

Administered by the Massachusetts Institute of Technology (MIT), this scholarship was established in 1966 in memory of I.E. Madsen, AISE research and standards engineer (1945–1965), to support undergraduate students enrolled in the MIT school of engineering. The 2014–2015 recipients are as follows:

- **Lisandro Jimenez**, from Tuscon, Ariz., USA. Lisandro is an electrical engineering and computer science major.
- **Roget Mo**, from Longmont, Colo., USA. Roget is a mechanical engineering major.
- **Yvonne Wangare**, from Nairobi, Kenya. Yvonne is a civil engineering major.

AIST Morrow Scholarship Fund

Awarded and administered by the University of Pennsylvania, this scholarship was established in 1966 in honor of Linn O. Morrow, who was secretary of the Philadelphia Member Chapter for 50 years, for engineering students enrolled in the School of Engineering and Applied Science.

The 2014–2015 AIST Morrow Scholarship Fund recipient is **Jacob Prosser**, from Fresno, Calif., USA. Jacob is a chemical and biomolecular engineering major.

The Value of Industry Internships

Dustin A. Arvola
2015 Steel Premier Internship scholar

The AIST Premier Scholarship gave me the opportunity to intern with Steel Dynamics Inc. (SDI) for a second time. I worked in the cold mill of the Flat Roll Group in Butler, Ind., USA. The variety of projects and great co-workers are what brought me back to SDI. It is a place in which any engineer seeking to gain management experience can grow and thrive. SDI not only hires talented individuals, but also gives everyone the opportunity to showcase their abilities.

One of my main projects was to install two bulk storage tanks that would feed oil and coolant to a roll grinding CNC machine. This relatively simple assignment taught me the procedure of completing much larger projects. I was responsible for tasks ranging from negotiating labor/material costs with contractors to using fluid mechanics to calculate outlet pressures and flowrates. My role as an engineer is to be a leader who orchestrates successful projects. It takes communication, critical thinking and a well-planned schedule to turn an idea into reality.

My internship experience with SDI has revealed to me how much I enjoy being a project manager. Being a project manager allows me to accomplish a task by using the resources and people around me. It is my desire to attend graduate school to pursue an advanced degree in mechanical engineering. My undergraduate degree has been completely paid for thanks to the financial assistance of AIST and other organizations. The generosity of others has helped keep graduate school a possibility for me. I want to use my education and work experience to shape myself into not only a professional engineer, but also a leader in the steel industry.

Dustin Arvola completed his internship at Steel Dynamics Inc. – Flat Roll Group Butler.

Nicklas C. Barber
2015 Steel Internship scholar

When I think of steel, the first things that come to mind are skyscrapers, bridges and cars. Although steel is such a common engineering material for economic development, it is often overlooked and taken for granted by the average consumer. Working for ArcelorMittal over the past two summers has helped me realize how important and useful this material is. Winning this scholarship has allowed me to attend my final year without having to take out loans, and for that I cannot express my gratitude enough to the AIST Foundation.

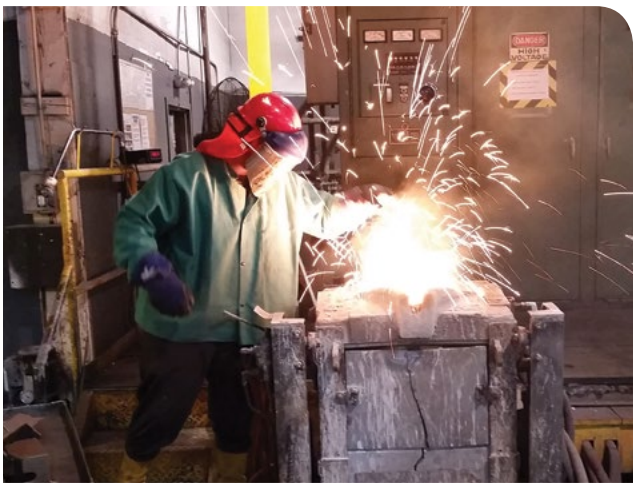
In the summer of 2015, I worked for ArcelorMittal Indiana Harbor. My project was challenging but rewarding, and I learned a lot about the steelmaking process during my time there. Specifically, my project was concerned with the removal of waste material generated from the sintering process. Understanding the current waste removal process and the equipment used was critical in developing a plan to solve the issue. During my time at the sinter plant, I was able to complete a cost analysis to automate four air cannons installed on the sides of the hoppers below the reverse-air-style baghouse. I also created multiple maintenance reports in an effort to improve the condition of hoppers. These documents outline areas of the hoppers that had cracks or holes, and improperly functioning equipment.

Through my internships with ArcelorMittal the past two summers, I have learned what I would like to do, places where I may like to work and live, as well as how to manage projects and work with others in order to complete the assigned tasks. With that said, I will be career hunting as I enter my senior year of college, and the steel industry will be at the top of that list. The steelmaking process is not a simple process, but rather a challenging one. That is what attracts me to the industry: the challenge. I will embrace this challenge because it will allow me to learn and grow not only as a professional, but also as an individual.

Zachary M. Corey
2015 Steel Internship scholar

My official title at Steel Dynamics Inc. – Roanoke Bar Div. was environmental engineering intern. My projects varied from designing safety procedures and inspections for ladders to coordinating the disposal of unused transformers. Other projects that I worked on included updating ISO 9000 paperwork, documenting confined spaces and developing a safety program for guarded machinery. Each of these projects was then integrated into a centralized plant map. This map was something that I had started the previous summer in conjunction with the overhaul of the spill prevention, control and countermeasures plan.

My capstone project was not assigned, but rather born from the necessity to integrate new technology into a process that has been done the same way for nearly 60 years. The challenge was to streamline the massive amounts of paperwork that stemmed from daily safety and maintenance inspections. I took on the task by trying software solutions from various companies,



Mark Emmendorfer completed his internship at Spokane Industries.

Cameron LaPresta completed his internship at Miller Centrifugal Castings.

presenting findings to my superiors and laying the groundwork to integrate a solution into the plant's daily operations.

Working at Steel Dynamics has opened the door to the infinite possibilities that await in the steel industry. I have gained valuable insight into the manufacturing world and how a company stays competitive in the international market. Furthermore, the scholarship has helped ease the burden of student loans, which has given me the chance to broaden my education beyond mechanical engineering. As a result, I have been able to take additional classes to develop skills such as metal casting, welding and metal fabrication.

Mark C. Emmendorfer
2015 Steel Internship scholar

Being awarded this scholarship has helped me out significantly. It went toward an appreciable amount of my tuition this year, and I am very thankful. Obtaining an internship was part of the scholarship. I spent my summer in Spokane, Wash., USA, working at Spokane Industries, a steel foundry that also pours high-Cr white iron castings. My project studied the grain refinement of high-Cr white iron and the effects on its mechanical properties. This was done by adding inoculants in the ladle. I learned quite a bit about this intriguing iron. The microstructure consists of a multi-phase structure of carbides, martensite and retained austenite in the heat-treated condition. I am now in the process of completing wear tests and three-point bend tests. I thoroughly enjoyed my time working at Spokane Industries and worked with many great people. Working with such an interesting alloyed cast iron has made me want to continue working with this metal. I would love to work for Spokane Industries in the future. I plan on staying at Missouri University of Science and Technology to pursue my master's degree while working on a foundry-related project, hopefully studying high-Cr white iron or cast iron. I would like to thank AIST for this very generous scholarship, Spokane Industries for a great experience and my professors at school for assisting me with my project.

Cameron J. LaPresta
2015 Steel Internship scholar

AIST has provided me with an extraordinary opportunity. In addition to receiving the Steel Internship Scholarship, I was given an opportunity to work for a company. I am grateful for the financial assistance; with the cost of college today, any financial help is much appreciated. Paying for college can be a stressful task, but AIST has helped to relieve that burden. I cannot thank AIST and its sponsors enough for their generosity.

My internship was with Miller Centrifugal Castings International. This was my second internship with the company, so I was able to see a lot of the projects that I worked on last summer be put into action this year. One of my main projects was to completely renovate their metallography laboratory. I designed a state-of-the-art laboratory from the ground up, creating a great space for analyzing materials. A few other projects I worked on throughout the summer included near-net-shape casting and creating chemistries for new products. I was the only metallurgical engineer on staff and had a great experience putting to test the things I learned through schooling.

Joseph L. Ogea
2015 Steel Internship scholar

Through AIST and the Virginia Tech Foundry Institute for Research and Education (VT FIRE), I have had the privilege of meeting some of the most passionate and engaging individuals in our industry. These men and women have proven invaluable to my education and success during my time at Virginia Tech, ATI Specialty Materials and SSAB Americas. I can only hope to rise to their committed level of excellence in everything I do. Being awarded a Steel Internship Scholarship is a tremendous honor, as it means the organizations, companies and individuals who have encouraged me believe I am worthy of special recognition. The scholarship, when paired with part-time work and G.I. Bill funds, will provide me with the means to finish school with no student debt. However, the most important opportunity this scholarship provided was the industry experience.

Joseph Ogea completed his internship at SSAB Americas.

Through this scholarship, I have obtained a position as a co-op with SSAB Americas from January through December 2015. My first six months in research and development were exceptional; among other projects, I was trusted with an independent project to improve mechanical properties in medium-carbon boron quenched and tempered steels produced at SSAB Mobile. In June, I transferred to SSAB Montpelier Technical Services, where I have been assisting with quality assurance and physical testing. As a member of the Technical Services team, I hope to learn even more about slab and finished plate quality assurance as well as product improvement. AIST, through this co-op, has provided me with a strong metallurgical, industrial and professional background with which I can confidently enter into industry upon my graduation in 2017.

Tyler S. Rigby
2015 Steel Internship scholar

The AIST Steel Internship Scholarship has helped me and my family financially, and me personally, with a fantastic opportunity. With rising tuition costs, this award could not have come at a better time in my academic career. Along with the monetary funding, this scholarship has provided the opportunity to secure a paid internship in the steel industry for the summer. I got the unique chance to travel out of my home state of Pennsylvania and go to Norfolk, Neb., USA, to work for Nucor Steel.

Nucor Steel–Nebraska is an SBQ mill in Norfolk. They produce various grades and sizes of round, channel, flat, and hex steel products. I worked in the engineering department, where I was assigned a variety of projects and tasks. Safety equipment, machine guarding and finished product handling equipment were just a few of the things I was able to work on. Within the projects, I was able to utilize knowledge from my engineering courses to perform real calculations and make new designs. On top of my own knowledge, I was able to learn new information about how a steel mill operates and what the engineers do on a day-to-day basis. Problem solving was done with the help of maintenance and operations during daily meetings and collaboration. Another very important part of my summer was safety. This is the number one priority, and I received great training from Nucor to ensure that I went home every day just the way I came in.

This experience has definitely had an impact on my future. I can honestly say I would work with Nucor again in the future as an intern or even a full-time employee. The steel industry has been presented to me in a great way, and I really enjoyed the opportunity I had this summer. I cannot thank AIST and Nucor enough for helping me with this scholarship and internship!

David G. Sedrak
2015 Steel Internship scholar

The generosity of AIST Steel Internship Scholarship program has not only helped me reduce the financial burden of school, but it has also helped me learn more about the vast opportunities in the steel industry.

My internship at ArcelorMittal Burns Harbor was an awesome, eye-opening experience that got me interested in learning more about the steel industry. I cannot fully express my gratitude for the AIST Steel Internship Scholarship.

My internship was in MEU, Maintenance Administration, Building Maintenance Department. I had the opportunity to work in various areas of the plant and was exposed to many of its operations and processes, which heightened my enthusiasm for the steel industry.

I repaired roofs in various locations, installed a sliding door in the hot strip mill roll shop No. 2, performed crane runway girder structural repairs and replaced the kitchen grease interceptor at the AMUSA office building.

With the help of my supervisor, Mike Mahaffey, and my mentor, Chris Shabi, I learned all of the steps involved in successfully beginning a maintenance project.

The exposure I received within the industry enhanced my understanding of the profession and solidified my ongoing interest in the steel industry. This internship has definitely increased my interest in pursuing a career in the steel industry.

Aaron S. Weir
2015 Steel Internship scholar

My internship at AK Steel Corp. – Butler Works has been a great experience provided by AIST's Steel Internship Scholarship program. I felt very welcomed and respected. Everyone was very friendly and helpful throughout the entire safety and orientation process, as well as throughout the remainder of my internship. Upon completion of my safety training, I began work right away as a process technology engineering intern in the steelmaking department. I was tasked with various improvement projects that focused on the application of my previous knowledge and also required learning new, specialized information about steelmaking and the involved processes. Overall, the entire experience was very rewarding, and I gained additional knowledge about the steel industry and various technical aspects involved with steel production that I would not have learned otherwise. The financial component of the Steel Internship Scholarship will help me pay for a respectable portion of my tuition for my final year of college at Virginia Tech, and the sum is greatly appreciated. My internship has provided additional interest in pursuing a career in the steel industry. I am very thankful for AIST and its scholarship programs, and I would like to send a special thanks to everyone at Butler Works.

Sydney Weiss completed her internship at ArcelorMittal Burns Harbor.

Maggie Zhang completed her internship at Nucor Steel Tuscaloosa Inc.

Sydney G. Weiss
2015 Steel Internship scholar

This summer, I was an environmental engineering intern at ArcelorMittal Burns Harbor. I was exposed to many sides of the Burns Harbor plant, as well as other plants owned by ArcelorMittal. I volunteered at an event in which elementary school students came to the plant, learned about the environment and performed stewardship tasks in the forests on-site.

My first project was to create a mass balance of one of the many waste treatment systems within the plant. I took samples, compiled data and created a model to complete this task. It was challenging, and not everything was answered by the end of the experience. In the end, I created a successful model that will be used to help predict how the waste treatment facility should tackle different issues when they arise.

My last project involved ArcelorMittal's dedication to creating positive, environmental impacts. ArcelorMittal has become a liaison between the Wildlife Habitat Council and other corporations in the area located near the National Lakeshore of Indiana. Together they have worked to remove invasive species on their property to restore the National Lakeshore's ecosystems. I was able to identify key companies in the area so that ArcelorMittal could continue its mission of creating a sustainable future for industry and the environment.

This internship allowed me to see what manufacturing entails. It truly has changed my view of business in the United States. As someone who values the environment and its health, it is hard to say that what the steel industry does is good for the environment. However, after working at this plant, I have seen the dedication that they have to doing their job to the best of their ability. They are constantly looking to improve the facility and decrease its impact on the environment. With EPA regulation and standards, the United States has allowed for manufacturing to be less harmful to the environment than in other countries, and this is a great thing and something to be truly proud of. After working here, I would be more than willing to work for the steel industry to continue to improve its environmental impact.

My plans for after graduation are to attend graduate school. I am unsure if I will obtain my Ph.D., but I plan to obtain a master's degree. This summer has encouraged me to continue my studies to a higher level of education so that I can bring the most to my career in the future.

I am incredibly thankful to AIST and ArcelorMittal. Without the Steel Internship Scholarship, I would have been forced to take out more student loans. This grant means so much to me and my family, and we are truly grateful that I was awarded this wonderful gift.

Maggie L. Zhang
2015 Steel Internship scholar

In the summer of 2015, I completed an engineering internship with Nucor Steel Tuscaloosa Inc. I found the internship to be a highly educational and rewarding experience. Not only did I gain knowledge about engineering and the steel industry, but I was also able to further develop my teamwork and leadership abilities as well as safety training, all of which are crucial skills to have in this industry. Having this experience tied together with the Steel Internship Scholarship was a fantastic opportunity for me, an individual completing a degree in engineering, to be immersed in the industry and get real-world work experience.

The Steel Internship Scholarship will aid in funding my education and has helped me realize my aspirations of working as an engineer in this industry upon graduation. Although my career path has many potential trajectories, I am certain that the positive experiences gained through this internship and aided by the Steel Internship Scholarship will remain with me no matter where I go.

Steel Curriculum Development Grant Recipients

The AIST Foundation grant programs are aimed at attracting top scholastic talent to the North American steel industry. This grant awards university professors US$5,000 per year for up to five years to fund proposals designed to utilize undergraduate and graduate students to assist in enhancing and updating industry curriculum for use in ferrous metallurgy education. The underlying objective of the grant programs is to increase industry awareness within the academic community.

Since 2005, the program has awarded US$285,000 in Curriculum Development Grants. This grant, targeted at both print and Web-based programs, enables steel-related curricula to be taught at the university level with respect to production processes, grade properties and applications. For more information on this and other programs, visit AISTFoundation.org. The 2014–2015 Curriculum Development Grant recipients, objectives of their grant, and reports follow, beginning with a proposal from a new 2015–2016 Curriculum Development Grant recipient.

Purdue University

Bahr

David F. Bahr, Materials Engineering

Objective: To improve the Material Science and Engineering (MSE) curriculum at Purdue University so that students have more knowledge and hands-on experiment and simulation experience in modern steel and iron alloys. New experiments and a materials database will be introduced in a series of undergraduate courses to help students become more familiar with ferrous metallurgy and its applications. Five different tasks will be introduced to develop the laboratory experiments and simulations tied to homework in several MSE courses that cover freshman, sophomore and junior-level students, and one course that is a senior elective. The proposed ideas will motivate students to be more knowledgeable about the steel industry and the modern advances in alloy development, and prepare more students to be strong candidates for career opportunities in this field, benefiting both students and the needs of the industry.

In addition to the new experiments, the MSE program will introduce use of a modern iron and steel database for computational tools that includes phase diagrams, driving forces, etc., and is used in industry.

- **MSE 190: Introduction to Materials Engineering** — The freshman course consists of lectures and demonstrations covering introductions to the general classes of materials and exposing them to the processing, structure, properties and performance relationships for materials. The course is more survey and "experience" than solely content-driven, and examples highlighted in the course tend to focus on capturing the excitement of new materials development. The proposed idea for this course is to introduce a demonstration and subsequent experiment for the course that doesn't require extensive laboratory training and can be carried out in a classroom environment.
- **MSE 235: Materials Structure and Properties Laboratories** — This sophomore course includes laboratory experiments with the usage of standard equipment. The main purpose of this course is to understand the property-structure relationships in materials. Students learn how to measure mechanical, microstructural, thermal, electrical and optical properties with computer-aided data analysis. The proposed modernization experiment for this course is to add a new, recently developed microalloy to the impact testing matrix that will allow comparison between the properties of a new, advanced steel alloy and the conventional plain carbon steel.
- **MSE 335: Materials Characterization Laboratory** — This fall semester course in the junior year focuses on the principles of analytical methods to characterize the structure and composition of materials. The main laboratory techniques used in this course are optical microscopy, scanning electron microscopy and x-ray diffraction. The proposed experiment for this course is to prepare a steel cone-structured sample to do a quench test and study the microstructure and be able to do a time-temperature-transformation curve from the hardness profile.
- **MSE 367: Materials Processing Laboratory** — This course aims to give students an intensive experience in processing techniques that are used for metals, ceramics and polymers. The current metals lab (run by students) in this course is making an aluminum-bronze coin, starting from smelting, alloying and ingot casting, hot rolling, cold rolling, blanking, and stamping. The second half of the course involves a student-selected lab. The proposed

change to the laboratory is to incorporate a selected lab that will incorporate joining stainless steel using welding, with the resulting structure being analyzed for heat-affected zones.

- **Iron and Steel Database for use in lecture and lab courses** — While experimental updates are crucial to students' experiences with modern steel alloys, the growing importance of simulation and computation within the field cannot be neglected. The School of Materials Engineering at Purdue has a license for Thermo-Calc Software, but currently only the aluminum database is included. Thermo-Calc has a large selection of thermodynamic data, phase diagrams, and many other databases; expanding this tool to include the database for iron and steel would allow more real-world examples that could be used to compare to lab courses. Undergraduate students would use these databases in their laboratory course study and associated lecture courses.

Colorado School of Mines

Bourne

Gerald R. Bourne

Objective: To create a package that can be employed by professors at other universities to instruct students on concepts in ferrous metallurgy. Laboratory manuals will be created for each set of experiments, along with a list of vendors from which to obtain samples. Each laboratory exercise will contain pre-lab materials, including a video presentation of lab concepts and procedures.

The project started in the Spring 2015 MTGN348 Microstructural Development course, which consisted of 53 students, most of whom were junior-level undergraduates majoring in metallurgical and materials engineering. A lab manual was developed to explain the procedures to be carried out in this exercise.

Sixty samples of plain carbon steel of grades 1018, 1045 and 1095 were ordered in appropriate ASTM E-8 tensile dogbone geometry. Six different heat treatments were applied to the three carbon concentrations for a total of 16 conditions (not every heat treatment was applied to every carbon concentration). Each student was responsible for at least one condition, and there were three samples for each.

Each sample was prepared for metallographic examination by mounting, polishing and etching. Samples were examined in the light optical microscope, but due to the extremely fine microstructures, samples were also examined in the scanning electron microscope. In addition to microstructural characterization, each sample was tensile tested. The data from each sample was shared with the entire class, and several meetings were held to discuss the results.

Students were asked to create individual lab reports to consider all of the microstructural and mechanical data from all of the sample conditions. The students needed to consider how the processing conditions resulted in the various microstructures and how those microstructures imparted different mechanical properties.

Based on the results from the tests, the laboratory manual was refined to address issues discovered in this first year of testing. The project will be continued in MTGN445 Mechanical Behavior of Materials this fall.

James Madison University

Kyle G. Gipson, Engineering

Student assistants: Gail Moruza, Rachel Hollenbeck and Brian Hernandez

Objective: To enhance the exposure of students to ferrous metallurgy by developing and implementing new modules for two courses — Materials and Mechanics (ENGR 314) and Materials Characterization (MATS/PHYS/ENGR 381) — both at the junior level. In addition, technical electives (ENGR 298/498) will be developed in conjunction with the Center for Materials Science curriculum committee to function as a metals track within the materials science minor.

In the original proposal, there were two major tasks to be accomplished with the funding in the five-year window of the grant: (1) development and introduction of new course modules in existing courses and (2) development of objectives, syllabi and topics for new courses that will serve as engineering technical electives and/or courses within a materials science minor that completes the "metals track." Within each task, the following milestones were set to be achieved within the two years:

- Development and introduction of new course modules in existing courses:
  - Identify potential industrial partners and AIST representatives interested in course development (completed).
  - Student assistant will identify sources to complement current reference material: *Materials Science and Engineering: An Introduction* by Callister and *Materials: Engineering, Science, Processing and Design* by Ashby (completed).
  - Work with the student assistant(s), industrial partner and AIST representatives in the design of the modules (lectures, handouts, packets, homework, projects, etc.) (ongoing).

- Development of objectives, syllabi and topics for new courses that will serve as engineering technical electives and/or courses within a materials science minor that completes the "metals track":
  - Build a consensus of topics and devise selection process (completed).
  - Work with industrial partner and student assistant(s) to assess and access on-campus capabilities (equipment and testing materials needed to engage in problem solving at the course level) (completed).
  - Have student assistant(s) visit with industrial partner to produce process introduction/preliminary safety presentation of the industrial partner's facility (completed).
  - Meet with industrial partner to create case studies (ongoing).
  - Student assistant(s) will aid in the design of the modules (lectures, handouts, packets, homework, projects, etc.) and kits of materials and equipment needed for activities (ongoing).

Three full modules have been created (Fatigue Tester Laboratory Assignment, Grain Size Laboratory Assignment and Hardness Laboratory Assignment), and two have been implemented within an engineering elective course that is part of the minor in materials science. Plans are to incorporate the three full modules into a required engineering science course and implement the one module that is under development (Structural Steel Selection) into a required engineering design course.

Saginaw Valley State University

Robert B. Tuttle, Mechanical Engineering

Student assistant: Andrew Maschke

Objective: To create a set of video tutorials and screencasts related to analyzing steels. The first part focuses on quantitative microscopy techniques, while the second is geared toward analyzing phase diagrams.

The focus of the project this year was to create a set of tutorials on how to analyze binary and ternary diagrams. Andrew Maschke, a mechanical engineering major, was employed on this project during the 2014–2015 academic year. Maschke created tutorials for binary systems that covered basic nomenclature, the lever rule, tie-line analysis and proeutectoid calculations. Students taking ME250 Principles of Engineering Materials in the Winter 2015 semester had access to these videos. Several of those students commented that it helped to have these additional reference materials while learning phase diagram basics. They found the tutorials on proeutectoid phase determination and calculation to be especially helpful. Maschke completed tutorials on basic ternary diagram nomenclature, composition determination and solidification paths. Examples from the Fe-Cr-Ni and FeO-CaO-SiO_2 ternary diagrams were used for the ternary systems. These provided a good comparison of both the behavior of metallic systems and that of ceramic systems. Prior to this work, Maschke had no experience with ternary phase diagrams. It took him a considerable amount of time to learn how to analyze these and determine how to present them. All of the videos have been uploaded to YouTube (https://www.youtube.com/user/svsufoundry) and are available for anyone to use. The principal investigator (PI) plans on using the ternary phase diagrams videos this coming fall semester for his ME 570 Physical Metallurgy graduate course.

As a result of this project, Maschke was able to obtain a co-op position with Nexteer Automotive at the start of June 2015. He is involved in the design of steering systems that require the use of advanced steels.

Two steel mill tours were conducted this academic year. Eight students attended the U. S. Steel – Great Lakes Works tour in October 2014. The students were given an overview of operations at the plant, a tour of the galvanizing line and training facilities, and a driving tour of the blast furnaces and continuous caster. Nine students and one new faculty member attended the tour of AK Steel Corp. – Dearborn Works in April 2015. The students toured the blast furnace controls, galvanizing line, cold rolling line and hot mill. Driving tours of the continuous caster and blast furnace were also included. Personnel at AK Steel also discussed career opportunities with the students, who left with a favorable impression of the steel industry and are strongly considering the industry for employment.

Saginaw Valley State University students toured U. S. Steel – Great Lakes Works in October 2014.

University of Alberta


Nychka

John A. Nychka, Chemical and Materials Engineering

Student assistants: Scott Pavelich and Meisam Nouri

Objective: The long-term goal is to develop a complement of visually based teaching tools to demonstrate the correlation between physical properties in carbon steels and their microstructure. Such materials will be distributed worldwide through publication of a post-secondary textbook and through outreach activities to schoolchildren. In the short term, a standard reference set of specimens will be created to demonstrate the effects of chemical composition and processing on the structure and properties of steel.

The complement of Charpy specimens have been prepared and heat treated, and notching is in process. The shop's electrical discharge machine (EDM) is down due to renovations and a recent move. Charpy testing will soon be completed, along with metallography and fractography.

Again this past year, progress has been made in increasing the profile of steel metallurgy to international educators. Dr. Nychka used some FeMET funds to attend the North American Materials Education Symposium (NAMES) in Ohio to give an oral presentation entitled "Decoding Complexity and Complications (in Materials Design)."

In the context of improving the profile of steel metallurgy in education, Dr. Nychka recently shifted his capstone design course to industrially based projects, of which more than 80% had a strong component of metals and materials processing for enhanced performance such as wear or corrosion resistance. Various pipeline, welding, heat treating and wear-resistant overlay coatings projects were sourced from industry.

In addition, recent curriculum changes have been made to include new courses in materials processing, corrosion and degradation, and performance of materials (all with a large component of steel-based case studies and content). Dr. Nychka is currently on sabbatical collecting case studies and information to bring back for the development of some of the course content, such as materials selection in the mining sector. The content generated from the curriculum grant will be dovetailed into such courses.

University of Windsor


Bowers

Randy J. Bowers, Mechanical, Automotive and Materials Engineering

Student assistant: Adaeze Awunor

Objective: Curriculum development will occur as a series of learning modules. Each module will identify a set of learning objectives; problem-based learning experiences will be included in applied or laboratory modules. Two modules will be produced in each of the four years.

The original proposal listed eight learning modules that were identified as lacking coverage in most of the current textbooks used for steel. The 2015 McGraw Hill textbook, *Steel Metallurgy* by S.K. Mandal, treads on the content covered in several of the proposed modules.

Three of the eight modules are complete. Each consists of about 10–20 pages of text with figures and tables, equivalent to a textbook chapter. PowerPoint slides are in development to accompany classroom delivery.

The three completed modules are as follows:

- **Steel Characterization and Testing** — This laboratory module was completed by the student assistants. It contains student-friendly descriptions of the ASTM testing requirements for tensile, hardness, toughness and hardenability testing. As part of the hands-on portion for Windsor students, an example of each of the tensile samples listed in specification E8 was machined. Student laboratory exercises were developed, which highlighted the facilities and settings for University of Windsor equipment.

"The practical and hands-on approach to learning particular to AIST's steel assistantship program has been a real benefit to me and has translated into valuable work experience. Some highlights of my experience have been learning about the various applications of steel and its distinctive properties. I have had the opportunity to study and identify different compositions and phases of steel and to work with a furnace in observing the effect of heat treatment on steel. My experience has been good; I can't wait to apply all that I have learned in my future co-op work terms and upon graduation."

— Adaeze Awunor

- **Classification of Steels —** This module highlights four major classification systems for steel used in North America: AISI-SAE, ASTM, CSA and UNS. Additional classifications for specific industry sectors are mentioned.
- **Modern Steels —** This module focuses on the evolution of steel design, from its early focus on composition to its current focus on processing for properties. This discussion represents the missing link in steel education. It provides a framework for students to understand the drivers in the steel industry.

Virginia Tech

Druschitz

Alan P. Druschitz, Materials Science and Engineering

Objective: This three-year proposal covers the enhancement and expansion of existing lecture materials, development of learning aids (study flashcards) and a comprehensive set of notes to be provided to the students taking these classes, and development of steel-specific melting and casting laboratory demonstrations to be performed in the new Virginia Tech foundry.

Steel-specific lectures and laboratories have been integrated into four existing courses (MSE 4305: Metals and Alloys, MSE 3324: Elementary Metal Casting Laboratory, MSE 4324: Advanced Metal Casting Laboratory, and MSE 4304: Physical Metallurgy of Metal Casting) at Virginia Tech (VT) that are offered by the Department of Materials Science and Engineering (MSE). These courses are taken by a variety of engineering students from the following departments: Materials Science and Engineering, Mechanical Engineering (ME), Biomedical Engineering and Mechanics (BEAM) and Industrial & Systems Engineering (ISE).

Progress is being made on the creation of a website open to all students. The website is intended to expand the availability of learning materials developed by this grant to anyone interested in steel and/or steelmaking.

This segment of the program will include enhancement and expansion of existing lecture materials, continued development of learning aids (e.g., flashcards for studying), the development of a comprehensive set of notes to be provided to the students, enhancement of the steel melting, casting and analysis capabilities at the Virginia Tech foundry, the addition of computational materials modeling into the steel curriculum and continued development of steel industry and professional society contacts.

Over the past year, a group of seven MSE, ME and electrical engineering (EE) students plus three faculty toured Steel Dynamics Inc. – Roanoke Bar Div. Only two of these students and one faculty member had previously been to a steel mill.

A three-person MSE senior design team (Myrissa Maxfield, Ethan Edwards and Daniel Hodgkinson) worked on duplex stainless steels this year. This team developed melting and casting procedures for duplex stainless steels, melted and cast

(a)

(b)

Valerie Pegasus (left), Environmental Health and Safety, talks with Ethan Edwards (right) before the start of hexavalent chromium testing (a), and Ethan Edwards pours a duplex stainless steel directly from the furnace into a bonded sand mold at the conclusion of testing (b).

three duplex stainless steel heats (one common alloy and two new alloys), developed the appropriate heat treating procedures for these steels, learned the correct procedures for performing metallography and performed corrosion tests. They have entered their project in the ASM International Undergraduate Student Design Competition and will present and publish their work at the NACE Corrosion 2016 conference. As part of this project, the VT Environmental Health and Safety Department measured student exposure to hexavalent chromium during melting and pouring and determined that student exposure was well below OSHA limits.

Four classes have been updated to include material on steel: two lecture classes now include steel and steelmaking and two labs include steel melting and casting. The scientific understanding of the metallurgy of steelmaking is quite advanced, but the key processes have changed and evolved. One goal of this new curriculum is to teach the current state of the art so that the students are well prepared when they enter industry. Also, information on safety and environmental impact are integrated into all of these classes.

To develop these new classes, the support of the steel industry has been critical. The AIST Southeast Member Chapter and the Steel Manufacturers Association serve as primary sources of local industry contacts. Steel Dynamics Inc. – Roanoke Bar Div. and Gerdau Long Steel North America Petersburg Mill are the two nearest steel mills that VT is now actively working with.

Today's classroom has been transformed into a multimedia setting that requires audio and visual learning aids (multimedia lectures, electronic homework, online notes, etc.). Kayla McNabb (rhetoric and writing Ph.D. candidate, Department of English) is currently helping to "liven up" the lecture slides to make them more interesting and exciting and to ensure that all references are accurate and up-to-date.

The Senior Design Team melted and poured duplex stainless steel directly from the melting furnace into a bonded sand mold after approval by Environmental Health and Safety.

Did You Know?

Manufacturing Day Producers Collaborate With Canada's Manufacturing Month Organizers

The co-producers of Manufacturing Day℠ announced a collaboration with the Canadian Manufacturers & Exporters (CME) to expand the annual celebration of manufacturing across North America.

CME declared October as Manufacturing Month in Canada, and the organization is committed to supporting the development of manufacturing open house events across all provinces throughout the month. This includes special plant tour guides created specifically for manufacturers in each of the provinces. Those guides have been shared from CME's Manufacturing Month portal (www.mfgmonth.ca) and posted on the Manufacturing Day website (www.mfgday.com) in a special Canadian resource section.

Manufacturing Day was developed to improve public perception of manufacturing and is supported by thousands of manufacturers as they host students, teachers, parents, job seekers and other local community members at open houses designed to showcase modern manufacturing technology and careers.

Manufacturing Day co-producers in the U.S. include the Fabricators & Manufacturers Association International, the National Association of Manufacturers, the Manufacturing Institute and the National Institute of Standards and Technology's Hollings Manufacturing Extension Partnership.

"The skilled labor crisis exists on both sides of the border between our countries," said Jeff Brownlee, vice president, public affairs and business development, CME. "We all need to focus on creating a showcase for manufacturing and encouraging young people to explore manufacturing careers if we are to keep this vital sector of our economies strong in the decades to come. Through this collaborative effort, we can deliver the important messages with strength and clarity."

Canadian manufacturers can now register their Manufacturing Month events on the Manufacturing Day website so that potential visitors will be able to find events and register to attend them.

For more information about international manufacturing collaboration in October, please contact: Patricia Lee of Fabricators & Manufacturers Association International at patl@fmanet.org or Brad Fougere of Canadian Manufacturers & Exporters at brad.fougere@cme-mec.ca.

Kent D. Peaslee Junior Faculty Award

Established in 2013, this award was named in honor of the late Kent D. Peaslee in recognition of his many years of dedicated service to AIST, and in memory of his unequaled passion for teaching and promoting the steel industry to students, faculty members and steel industry personnel. As the original sponsor and architect for the award, Dr. Peaslee's achievements have forged a legacy of encouragement to all those dedicated to advancing the techncial development, production, processing and application of iron and steel.

Paul G. Sanders, Michigan Technological University

Sanders

The primary objective of the AIST Foundation Junior Faculty Award is to "encourage students to pursue careers in the iron and steel industry." Toward this aim, it is important to strategically invest resources to augment the current flow of students. By providing information and organizing activities early in their collegiate careers, students can be engaged and supported as they progress in learning more about the steel industry through both academic and industrial involvement. It is critical that students develop personal relationships during this journey, as they give meaning and relevance to their experiences.

The best way to identify talented students interested in the steel industry is through close partnerships between universities, their students and the steel industry. Each partner has resources and experiences to share as they progress along a path that develops students who are ready to contribute to the steel industry when they complete their college careers.

The activities contained in this proposal are intended to achieve the following performance targets:

1. To double the number of Michigan Tech graduates employed by the steel industry.
   – The current average is 10/year, so the target by year 3 is 20/year.
2. To leverage by 100% the proposed AIST investment during the award period through utilization of other resources.
3. To leverage the proposed AIST investment to grow steel industry partnerships in order to maintain the proposed activity levels beyond the three years of AIST support.

Year 2 Highlights

Michigan Tech Steel Industry Day

The second annual Michigan Tech Steel Industry Day was a great improvement over the first event. The event was planned by Michigan Tech Career Services and attended by Lori Wharrey, manager — board services of AIST and 10 companies (compared to four in 2013).

Improvements Made in 2014:

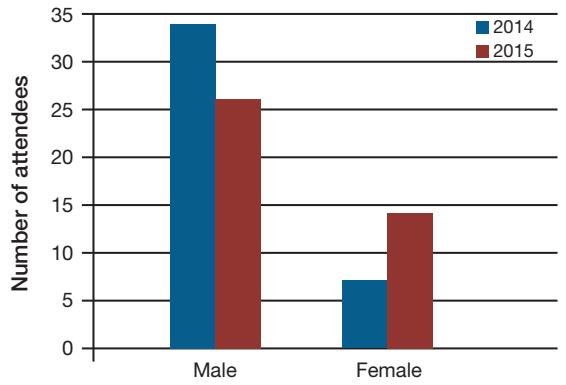
- Better date: The event was held on 24 September 2014. Held a few weeks earlier than in 2013, the weather was better, and it was held just before the university career fair. Because of the nicer weather, the mid-day event was held outdoors. Twice as many students participated (1,000 vs. 500).
- The evening gathering was held in a meeting room in the library. Only about 40 students attended (compared to 130 in 2013). A prize drawing was held for 10 US$100 gift cards; student entries were collected if they answered steel trivia questions at the mid-day event.

The second annual Steel Industry Day was held in the center of Michigan Tech's campus around lunchtime on 24 September 2014.

Planned Improvements for 2015:

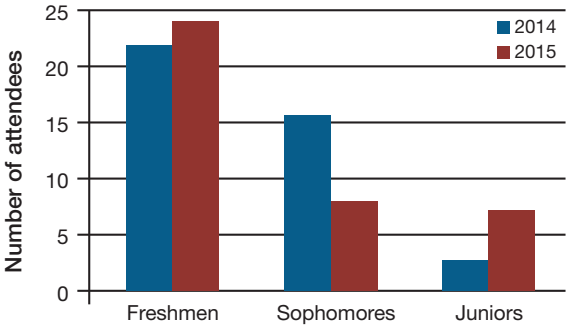
- Include an activity: A blacksmithing demonstration will be held at Steel Industry Day in 2015. The smell of burning coal, the sound of hammers pounding on anvils and the action should entice a greater number of students to stop and visit. Industry representatives will be in the area to assist with safety and talk about their companies.
- Bigger event signage and a clear entrance to the tent.
- Require students to talk to industry representatives before they get their lunch ticket.

Figure 1



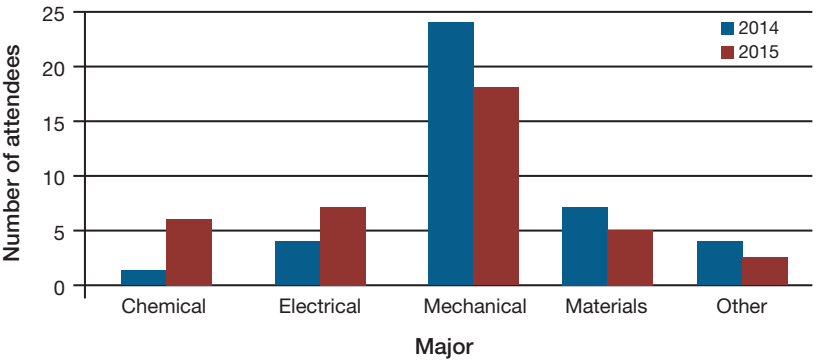
Comparison of male and female plant tour attendees for 2014 vs. 2015.

Figure 2



Comparison of freshmen, sophomore and junior attendees for 2014 vs. 2015.

Figure 3



Comparison of various engineering majors represented by plant tour attendees for 2014 vs. 2015.

Michigan Tech Steel Plant Trip and Leadership Experience

The second annual Michigan Tech Steel Plant Trip and Leadership Experience was held at Nucor Steel–Indiana in Crawfordsville, Ind., USA.

The total number of students was about the same (39 vs. 41). However, in 2015 there were more women (about one-third of the attendees) (Figure 1). In addition, there were more freshmen attendees (the target audience is young) (Figure 2) and a broader range of majors was represented, including a larger number of chemical and electrical engineers (Figure 3).

The students enjoyed both the tour and the leadership training, but preferred the plant tour. Although the students don't value leadership training at this point in their careers, this is likely their first experience with a topic that will be relevant to their future engineering careers.

Following the trip, the students completed a survey about the experience. As was seen last year, the plant trip had a dramatic impact on the likelihood of students to consider a career in the steel industry (400% increase in those responding "Definitely yes").

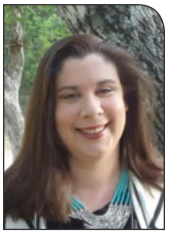
Improvements for 2016:

- Attract more students: the bus will hold 50. The last two years, 20% of the students canceled, most within a day or two of the plant tour.
- Make better use of time spent in transit, especially by showing videos related to safety and steelmaking. In particular, process maps, aerial pictures and other details of the specific steel plant being visited will give the students a better understanding of the overall operation and a greater appreciation of what they will be seeing at the plant.

Year 3 Update

As Prof. Sanders will be on sabbatical for the 2015–2016 academic year, AIST has suggested that Year 3 funding be requested in Year 4. This is a good suggestion and makes sense, given the interactive nature of the award and the steel industry. However, it is prudent to continue the two primary activities of Steel Industry Day and the Steel Plant Trip in 2015–2016. In alignment with this decision, Prof. Sanders has requested and received permission from the AIST Foundation for a "no-cost" extension to his 2014–2015 funding. There will be no incremental cost to the AIST Foundation, but steel activities will continue at Michigan Tech during Prof. Sanders' absence. This direction is also aligned with the idea that the Kent D. Peaslee Junior Faculty Award is seed money for developing an ongoing and eventually independently funded program to increase student awareness of the steel industry.

Laura N. Bartlett, Texas State University



Bartlett

Significant progress has been made over the last academic year toward increasing awareness and interest in the steel industry among Texas State students. Some of these achievements include increased collaboration with the steel industry, support of research projects, development of internship programs, outreach to local schools and establishment of a Material Advantage Chapter at Texas State.

Progress has been made toward building connections with steel companies in Texas as well as mills in other locations across the U.S. There are several steel mills within a day's drive from the Texas State campus. Among these include Commercial Metals Company (CMC) in Seguin, Texas. CMC is only a 30-minute drive from the Texas State campus. Additionally, the PI has established collaborative partnerships with Nucor Steel–Texas, Gerdau Long Steel North America Midlothian Mill and steel foundries such as Southwest Steel Casting Co. and Quality Electric Steel Castings. Texas State is currently building connections with other steel manufacturers across the nation, such as Steel Dynamics in Fort Wayne, Ind., and SSAB in Mobile, Ala.

Establishment of an Industrial Advisory Board (Year 1)

It is important for the Engineering Technology program to receive feedback from industry on the effectiveness of its academic programs and to receive input regarding changes in the curriculum needed to keep pace with the changing needs of industry. Sam Matson, CMC Americas energy manager, now represents CMC on Texas State's newly created Manufacturing Engineering Technology Industrial Advisory Board. Matson and his colleagues have worked with Texas State faculty and staff to implement course curriculum of interest to steel manufacturers and have provided guest lectures. CMC has significantly enriched the university's programs in the Engineering, Materials Science, and Engineering Technology programs and has donated more than US$10,000 in equipment, consumables and ferroalloys to Texas State's foundry. A critical need identified by AIST is to increase the number of electrical engineers and electrical engineering technologists in the steel industry. Matson and other personnel from CMC have worked with other faculty members at Texas State to increase the amount of electrical engineering students who take a job in steel manufacturing.

Establish an Internship Program With Local Steel Manufacturers (Years 1–3)

An internship is required as part of the Engineering Technology degree programs. In the summer of 2014, an internship program was established between Texas State and CMC Seguin. That summer, CMC hosted two interns from Texas State in the meltshop: Sabra Serino, a senior in the Manufacturing Engineering program, and Taylor Walls, a senior in the Engineering Technology program. The students worked on a number of industrial projects, such as inclusion analysis and process control for non-steady-state casting conditions and tensile prediction based on chemistry, among other projects. Industrial trials were conducted at CMC, and the analytical lab capabilities at Texas State were utilized for physical, chemical and mechanical property characterization. Results of the project were presented by Sabra Serino in the AISTech 2015 Undergraduate Student Presentation Contest, where she took first prize. This summer, Serino worked in the meltshop at CMC as a steelmaking process engineering intern.

The PI has also established an internship program with Nucor Steel–Texas in Jewett, which is only a 3-hour drive from the Texas State campus. In addition to CMC and Nucor, the PI is currently working to develop an internship program with Gerdau Long Steel North America Midlothian Mill, Steel Dynamics Inc. and SSAB.

Instruction of Short Courses and Seminars (Years 1–3)

At the request of CMC, the PI will conduct short courses and seminars on the physical and mechanical metallurgy of iron and steel for CMC personnel, as well as additional personnel from other corporations in the iron and steel industry and

Sabra Serino (center), Texas State Steelmaking Process Engineering intern, celebrated her placing first in the AISTech 2015 Undergraduate Student Presentation Contest with the CMC engineers who mentored her during her internship.

their customers. In October 2014, the PI conducted the first of these on-site seminars to CMC personnel from the Meltshop and Quality Departments, as well as to a group of participating students from the Engineering and Engineering Technology Departments at Texas State. Students were able to tour the mill and watch a video on steelmaking as part of this activity.

Seminars and Guest Lecturers (Years 1–3)

During the past year, CMC has provided five guest lecturers at Texas State University. These lectures have significantly increased the exposure of Texas State students to the steel industry and led to an increase in the number of students interested in a career in the industry. During the next academic year, the PI intends to increase the number of guest lectures by CMC as well as the number of student tours to the mill in Seguin. The PI will also invite other companies such as Nucor and Gerdau to give guest seminars to our students and to host tours of their mills.

Collaborative Research Projects With CMC Texas (Years 1–3)

Significant progress has been made with respect to collaborative research projects between CMC and Texas State. CMC awarded a US$5,000 grant to the Texas State University Department of Engineering Technology to establish a Metalcasting and Metallurgy Research Program to support research in steelmaking, casting, and the development of new steels and processes relevant to industry. This program is the first of its kind at Texas State, and subsequent donations and grants to this program will be used to support undergraduate and graduate research assistants as well as purchases of equipment and consumables.

Collaborative Partnerships With Other Mills in the Southwest (Years 1–3)

In the spring of 2014, Ross Wilkinson, process engineer from Gerdau Special Steel North America Fort Smith Mill and vice chair of the AIST Southwest Member Chapter, gave a lecture about the technological aspects of steelmaking. During his visit, he expressed an interest in helping to develop a Material Advantage Chapter at Texas State. That mission has been accomplished, and Texas State now has more than 20 new Material Advantage members. CMC, Nucor and Gerdau Long Steel North America Midlothian Mill all participated in the first annual Texas State Steel Industry Day on 2 April 2015. This event was a success, and plans are to include more steel industry representatives this academic year. Other steel companies such as SSAB and Steel Dynamics Inc. have agreed to participate.

Sabra Serino Chosen as Next Texas State Rising Star

Texas State University's Rising Star program spotlights faculty, staff and students who accomplish great things that embody Texas State's "Rising Star" slogan. The most recently chosen Rising Star is Sabra Serino, a senior in the Manufacturing Engineering program.

There's no doubt that Sabra Serino, soon to graduate from the Ingram School of Engineering, drew some initial inspiration for her field of study from her mother, who contracted helicopter repairs for the Navy and Army. She is a leader, and her composure and determination, both already highly polished at age 23, demonstrate the strength of her commitment to a future in the steel industry.

She started by creating her own opportunities. During her freshman year, she responded to a student technician job posting for the Engineering Technology Department. Her enthusiasm landed her the job, and what she saw during her first week on the job got her fired up.

"I helped out with a foundry pour," says Serino. "There's something about molten metal being poured into a casting, sparks flying, heat … everything immediately grabbed me, and I knew right then that's what I wanted to do for the rest of my life."

It is more than her own passion that validates that she's on the right track. First, there is the support of the company that has provided her with practical experience — CMC Steel Texas — where she has excelled as a steelmaking process engineering intern. Years in advance of graduation, Serino received full-time job offers from employers eager to put her talent to work. Her academic research, funded in part by AIST, Commercial Metals Company and the Texas chapter of the American Foundry Society, has been published in multiple industry journals with co-author Dr. Laura Bartlett.

In addition to her studies, Serino is also a member of several professional and service organizations, such as the Society of Manufacturing Engineers and Texas Graduate S.T.E.M. Ambassadors, and is secretary of the Texas State student chapter of the American Foundry Society. She is also chair of the newly founded student chapter of Material Advantage at Texas State.

Undoubtedly, the energy she has for all these extracurricular activities stems from her enthusiasm. "Once you find something you're passionate about, it's a feeling you can't shake. I love what I do," says Serino.

Original text provided by Texas State University. Photo by Chandler Prude, Texas State University.

CMC Steel in Seguin, Texas, hosted students from Texas State University four times over the 2014–2015 academic year.

Tours of Local Iron and Steel Industries (Years 1–3)

During the past year, CMC has hosted four tours of the steel mill in Seguin, with approximately 60–70 students in attendance. This is a significant increase from last year, in which approximately 20–30 students participated in two tours of CMC Seguin. CMC has worked with Texas State to develop opportunities for students to learn firsthand how steel is made.

These tours were enormously effective at convincing new students to consider a career in steel manufacturing. For most of the students who attended these tours, it was their first time in a steel mill. They were impressed at the level of automation and technology that has been adopted by the steel industry in recent years and CMC's commitment to safety in reducing the number of workers "on the floor." Steel mill tours have increased the number of students that have applied for internships and full-time positions at CMC.

In addition to CMC, the student professional society members of Material Advantage, AFS, SME and ASME toured Quality Electric Steel Castings in Houston, Texas, in January 2015. Students toured the EAF, coreless induction furnace, the melt deck, and the metallurgy and quality labs.

Milestones Scheduled for 2015–2016

- **Second Annual Texas State Steel Industry Day —** A tentative date of 1 October 2015 has been set for this event to coincide with the Fall STEM Career Fair. The PI continues to reach out to steelmakers to invite them to participate in our campus activities.
- **Steel-related activities in the classroom —** Plans are to continue to incorporate steel-related curriculum into TECH 1393 and 4330. With the addition of the new heat treating furnaces and the rolling mill, this will open up even more avenues to engage students in steel-related laboratories.
- **Tours of steel mills and steel foundries —** The PI will arrange for a two-day tour of Nucor and Gerdau. The PI will also increase the number of local tours to CMC Seguin.
- **Internship programs —** Texas State will continue to cultivate internship programs with CMC and other mills in Texas and across the nation.
- **Outreach events —** The PI is actively pursuing funding from NSF for a "Sustainable Steel Manufacturing" REU program to encourage students from local community colleges to pursue a career in the steel industry. We will also continue to host multiple tours and STEM camps for community college, high school and middle school students.
- **Research —** The students funded through this program will continue to complete current and future steel industry-relevant research projects. Students will be encouraged to present their work at MS&T, AISTech and other conferences. They will also be encouraged to publish their work in peer-reviewed journals. ✦

Webler

The third recipient of the Kent D. Peaslee Junior Faculty Award is **Bryan A. Webler**, assistant professor, Materials Science and Engineering, Carnegie Mellon University, Pittsburgh, Pa., USA. Webler's proposal is titled "Engaging Students With Steel Through Research."

Questions about the Kent D. Peaslee Junior Faculty Award and/or proposal process should be directed to Lori Wharrey at lwharrey@aist.org or +1.724.814.3044.