

MET, AFS, and FEF: University, Industry, and Foundation Collaboration That Works

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Introduction

The Mechanical Engineering Technology (MET) department at Indiana University - Purdue University, Indianapolis (IUPUI), the Central Indiana Chapter of the American Foundry Society (AFS), and the Foundry Educational Foundation (FEF) have had a long, successful partnership of preparing, promoting, and producing exceptional students ready for employment in the metalcasting industry. This relationship began more than twenty years ago at IUPUI and has continued to flourish because of the interest, dedication, and active involvement between all three organizations.

At IUPUI, the MET department is actively involved in foundry education. The School of Engineering and Technology has a formal student chapter of the American Foundry Society and is one of 32 schools in North America affiliated with the Foundry Educational Foundation. Each year, many students become involved with AFS and FEF and are rewarded for their involvement with internships, scholarships, and permanent job placement upon graduation. This does not include the many other sponsored activities by these groups that students can participate in.

Many universities have student chapters of professional organizations on campus, which help promote these organizations to prospective new graduates. The American Foundry Society is one such professional organization, but one who feels that the future success of the metalcasting industry is largely dependent upon obtaining the best, brightest, and most dedicated college graduates. Rather than waiting for students to graduate, AFS gets involved from the very beginning of a student's college career. Students are able to participate in professional meetings, conferences, and research projects, as well as network, obtain internships or permanent placement, and receive scholarships directly from the society. The society and industry benefits because a large majority of the students who were involved with the group take permanent positions within the industry.

The Foundry Educational Foundation is another group that is dedicated to enhancing the future of the metalcasting industry. The metalcasting industry is the sixth largest industry in the nation¹ and has the unique position of being a supplier to the larger five industries. The metalcasting industry has also been identified as one of the "industries of the future." The processes and products coming from this industry are largely taken for granted by the public and rather than letting the industry fade away, FEF has pooled the resources of this large community by bringing universities and companies together for the benefit of the students and the industry.

The University

Indiana University - Purdue University at Indianapolis (IUPUI) is a regional campus of both Indiana University and Purdue University all on one campus in the heart of the city. The university formally began in 1969 and houses several schools of Indiana University, including the nationally known schools of Medicine, Nursing, and Law as well as two Purdue University schools - Science, and Engineering and Technology. The Purdue School of Engineering and Technology at IUPUI is the largest undergraduate degree granting school on the campus. The school has approximately 2000 students enrolled and administers approximately 20,000 credit hours of coursework each semester.

Within the School of Engineering and Technology are several departments offering degrees ranging from Associate's to Ph. D. The department of Mechanical Engineering Technology (MET) is one such department. The MET department offers Associate's degrees in Mechanical Engineering Technology (MET), Computer Integrated Manufacturing Technology (CIMT) and Computer Graphics Technology (CGT). The department also offers Bachelor's degrees in each of these areas as well. The MET department enrolls approximately 300 students and administers approximately 2400 credit hours of coursework each semester.

The MET and CIMT degrees have considerable emphasis on manufacturing, design, and production. CGT has a manufacturing graphics track, which also promotes the manufacturing area. Typical with technology degrees, there are also a large number of laboratories accompanying these courses. A partial listing of the laboratories includes materials and material testing, metrology, non-destructive testing, instrumentation, thermo-fluids, a machine shop with manual and NC machines, and a foundry.

Each student progressing through the MET, CIMT or, CGT (manufacturing graphics track) program is required to take a manufacturing processes course, which in part covers the art and science of metalcasting. The CIMT students are also required to take a second course, which completely focuses on the metalcasting area. These courses give students a first-hand look at an industry that many take for granted, but rely on daily.

Many of the students enjoy working in the foundry (metalcasting) lab and want to do more. This is where the American Foundry Society (AFS) and the Foundry Educational Foundation (FEF) come in. The heavy automotive influence in the city and state gives students the perfect opportunity for industry experience and the supplemental outside support from AFS and FEF provides valuable encouragement to those interested students.

The Industry

Indianapolis has a sizeable manufacturing industry base. Many of these companies are producers of automotive parts and the automotive industry is considerably dependent upon metalcastings. Within Indianapolis, there are two large captive foundries - DaimlerChrysler Foundry and Indianapolis Casting Corporation. These foundries produce engine blocks for DaimlerChrysler and Ford Motor Company respectively. In addition to these two large foundries, Rolls Royce Allison has a single crystal investment casting operation for the production of their turbine

engines, Electric Steel Castings is a small steel foundry, and many other companies utilize castings in their products such as Allison Transmission, Visteon, and GM Truck Platform plus additional companies that are suppliers to the metalcasting industry such as Ashland Chemical. This represents only those companies within Indianapolis. Several companies are also located outside of Indianapolis making Indiana the 2nd largest foundry state in the country (following Ohio).²

The recent shift across the nation has been away from manufacturing, which has hurt the Indiana economy base and the metalcasting industries have suffered as well. To help prevent the demise of the companies producing metalcastings and the entire metalcasting industry, the American Foundry Society (AFS) along with the Indiana Cast Metals Association (INCMA) has put forth considerable effort in educating the public and legislators at the state and national levels about the industry. This has been one of the goals of AFS since its inception in 1896. As a direct result of this educational effort, the metalcasting industry has recently been identified as one of the "industries of the future" by the Department of Defense (DOD) and the Department of Energy (DOE).

AFS has 52 local chapters scattered across the U.S., Canada, and Mexico, where the industry leaders of the area can come together to discuss the issues within their companies. The society chapters are much like a brotherhood and its members are willing to help other members even though they may be competitors within the market. One of the more active chapters of AFS is the Central Indiana Chapter. This chapter has monthly meetings with an average attendance of approximately 70 members and actively participates in regional and national conferences and events. The activity of this group and the commitment to the industry is what led to the relationship between AFS and IUPUI. This follows the more significant accomplishment of the national chapter of AFS creating the Foundry Educational Foundation in 1947.³

The Central Indiana Chapter actively seeks the participation of IUPUI students from the time they enter college until they graduate. Along with FEF, they provide financial support to the students, jobs, and a direct link to the activities within the metalcasting industry such as conferences, expositions, educational programs, and legislative lobbying efforts. Employers also get to meet prospective new employees often years before graduation and have the ability to observe their professional growth throughout the student's academic career.

The Foundation

The Foundry Educational Foundation was established in 1947 with 3 original charter member universities. The goal of the foundation is to help sustain the metalcasting industry by providing qualified, enthusiastic, college graduates into this field. To become a member university, the school must petition to become an FEF affiliated school, go through an initial accreditation process and renewal visits every four years, and have programs that educate students in the areas of metalcasting or metallurgy. Since its inception, 29 additional colleges and universities have been accredited and continue to promote the goals of the foundation.

Students within the FEF affiliated schools register with FEF and are tracked throughout their college career. The foundation is sustained by corporate and individual donations and these

funds are used for student scholarships and the FEF annual College Industry Conference held each year in Chicago. FEF also uses their industry ties to help provide summer internships, co-ops, and permanent placement into the industry for their students. The foundation also serves as the perfect liaison for industry and university metalcasting research. This entity therefore creates the third leg of the tripod and ties together the 32 universities with the 52 chapters of AFS and the 2950 foundries across the nation.⁴

The Collaboration

Not everyone is going to become interested in metalcasting, but for those who do, AFS and FEF wants the experience to be rewarding. IUPUI was established as an FEF school in 1977 and has spent the past 20+ years educating students in the area of metalcasting, providing financial support to the students via FEF and AFS scholarships, and successfully placing many graduating students into the metalcasting industry.

Each academic school year, approximately 20-25 IUPUI students register with FEF and AFS. The students are fairly well split amongst the freshman through senior classes. Once registered, these students are then eligible for the many scholarships awarded by the two organizations. The Central Indiana Chapter of AFS typically donates \$4-7K, FEF directly donates \$7-10K as well as functioning as the executor for many other scholarships such as the H.H. Harris Foundation and the David Laine Memorial scholarships, which typically amount to an additional \$10-15K annually. Please refer to Facts and Figures section for a graphical/tabular summary of this information.

FEF also spends considerable effort, along with the university, tracking the students who register each year. Before any scholarship funding is released for an academic year, the students/university must provide information for each registered student from the prior school year. They want to know who received scholarship money, who went to the CIC, who worked in the industry over the summer months, what position they held, etc. This enables FEF to identify schools that are best utilizing their funding and also helps determine the placement rate for each university. This information is then factored into the following year's funding allocation and plays a major role in the re-accreditation scoring, which happens every 4 years. Please refer to Facts and Figures section for a graphical/tabular summary of this information.

This has been a great example of a "win-win" situation for everyone involved. IUPUI benefits from the relationship in several ways. First, the school receives scholarships for its students. The school also gains increased recognition within the metalcasting research programs of AFS, DOD, and DOE for being an FEF affiliated school. Thirdly, IUPUI and its students benefit from the corporate equipment donations helping to supply our laboratories with meaningful learning experiences for our students. In addition to the scholarships, the students receive summer internships, co-ops, permanent placement upon graduation, the opportunity to network within AFS and FEF, and the knowledge that their college education and association with AFS and FEF has resulted in these opportunities.

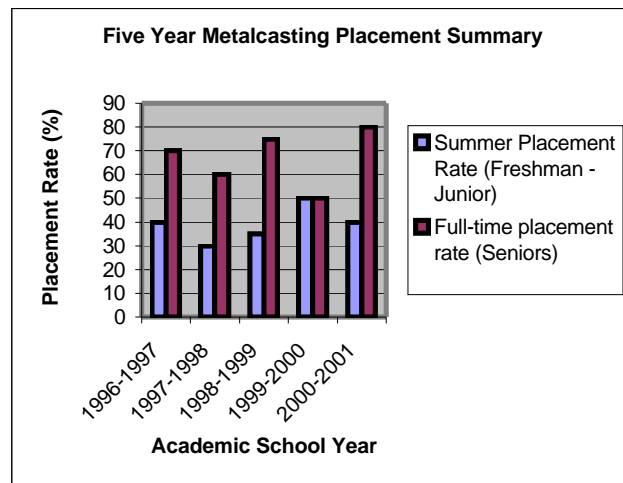
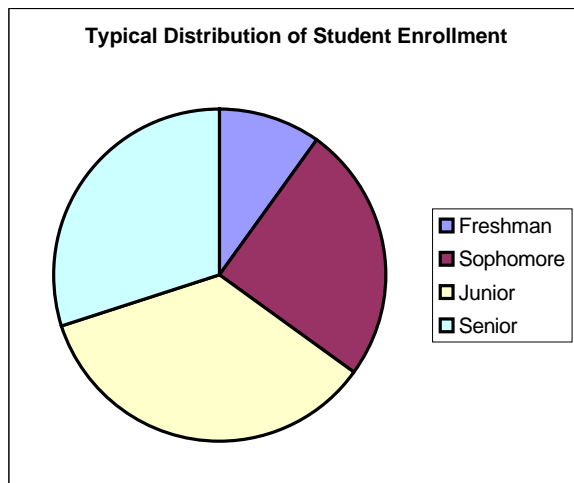
The metalcasting industry benefits by receiving enthusiastic, qualified college graduates interested in continuing the traditions started many decades ago. This helps reduce turnover in

employment, decreases training time for new employees, and provides a stable base in the industry for the next generation. The industry also receives valuable research information obtained by AFS research initiatives as well as university research programs associated with AFS, DOD, DOE, and many other agencies. The success of the industry is used to continue the success of FEF.

Although the direct benefit to FEF is more difficult to quantify, the fact that the foundation is still thriving after 54 years of existence, funded solely by donations, and metalcasting is the sixth largest industry in the nation says a lot about the success of the venture. The relationship between the three entities is one where the health of one promotes the health of the others and the demise of one will likely result in the demise of the others. As this is the case, it is hopeful that all three will have many more years of continued success.

As a result of this combined effort between the three parties over the past two decades, hundreds of thousands of dollars in scholarships have been distributed to the students, hundreds of thousands of dollars of equipment have been donated to the university by various corporations, hundreds of students have been placed in the metalcasting industry, and many of those students return their gratitude by becoming individual contributors to FEF and encouraging their companies to donate as well.

Facts and Figures



Annual Scholarship Distribution

<u>Source</u>	<u>Min</u>	<u>Max</u>	<u>Average</u>
CIC of AFS	\$4,000	\$8,000	\$6,000
FEF	\$6,000	\$10,000	\$7,500
H.H. Harris	\$8,000	\$14,000	\$9,000
David Laine	\$0	\$5,000	\$1,000
Other	\$0	\$5,000	\$1,500
Total	\$18,000	\$42,000	\$25,000

Sample Placement Information

<u>Corporation</u>	<u>Location</u>	<u>Example Job Titles (any location)</u>
DaimlerChrysler Foundry	Indianapolis, IN	Process Engineer
DaimlerChrysler Die Cast Facility	Kokomo, IN	Manufacturing Engineer
Indianapolis Casting Corporation	Indianapolis, IN	Supervisor
Rolls Royce Allison	Indianapolis, IN	Quality Engineer
Howmet Corporation	Virginia Beach, VA	Product Engineer
Dynacast	Milwaukee, WI	
Honda of America	Anna, OH	
Grede Foundry	Richmond, IN	
Cummins Engine Co.	Columbus, IN	
GM Powertrain	Defiance, OH	
GM Bedford	Bedford, IN	
Ford Motor Co	Detroit, MI	

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1. Casting For A Career, CD-ROM, Foundry Educational Foundation, 2000
2. Facts and Figures about the U.S. Foundry Industry, American Foundry Society, <[http:// www.afsinc.org/trends/](http://www.afsinc.org/trends/)>
3. About FEF, Foundry Educational Foundation, <[http:// www.fefoffice.org](http://www.fefoffice.org)>
4. Local AFS Chapter Information, American Foundry Society, <<http://www.afsinc.org>>

Biographical Information

Jamie Workman is an Assistant Professor in the Mechanical Engineering Department of the Purdue School of Engineering and Technology at IUPUI. She also serves as the FEF Key Professor for the school and actively participates in AFS.