



Everything Else Is Immaterial

Chapter of Excellence Nomination

Iowa State University

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ISU Material Advantage President 2016

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Report Summary

The Iowa State University Material Advantage Chapter (ISU MA) has had yet another fantastic year. Long term and short term goals were established at the beginning of the academic year in order to help develop and improve the chapter's student membership and involvement around the department and the community.

The chapter's Outreach Chairs worked to grow and strengthen the outreach program, through which many Iowa students, of all ages, were introduced to materials science and engineering. This year, ISU MA hosted or participated in 21 outreach events, many of them for students ranging in the k-12 age group. In addition to science outreach, ISU MA was also able to work closely with Iowa State University and Ames Laboratory on a number of volunteering events. Through these events, ISU MA members worked with Iowa State on different volunteering projects, and assisted Ames Laboratory in hosting its annual National Science Bowl Competition.

The ISU MA chapter had a record fundraising amount this year. The chapter's two Fundraising Chairs put in significant amounts of time and effort to increase the support from chapter members in order to assist in the fundraising events. Through these efforts, we were able to increase sales by selling more pizza each week.

With the work of the Fundraising Chairs and generous funding from Iowa State's Engineering Student Council, and the Department of Material Science and Engineering, 15 students were able to attend the Material Science and Technology 2015 conference, and 5 students were able to attend Congressional Visit Day in Washington D.C. at no cost to them. This was an amazing opportunity for our students, and one we were proud to be able to provide. Many students that attended MS&T were new to the conference and received valuable networking and educational opportunities.

As part of the efforts to continue the strong connection between the ISU MA chapter and the MSE department at Iowa State, many events were hosted together. These events included a "Fall Rally" for all students, faculty and staff, events with the learning community, picnics, and banquets. These events allowed incoming freshmen to not only get to know their peers and department, but also become introduced to Material Advantage, and the many opportunities it offered as well as provide a low-stress environment for students to spend time together. The excellent support from the department has helped encourage students to become involved, and a close connection to the learning community has brought new students to meetings. Through these efforts, ISU MA saw an increase in meeting attendance, and event participation.

This year also saw an improvement on the program planning. Five industry tours were scheduled through careful planning and relying upon established connections with companies and alumni.

Through these industry tours, students were able to sign up and travel with ISU MA to learn more about potential employers, the companies, and meet with professionals in the workplace.

An alumni relationship program is also underway as part of a long term project for the chapter. With the hopes of raising money for the students in the ISU MA chapter, this program will create a fund from which all travel expenses and conference costs will be covered. The ISU MA chapter is very fortunate to have an amazing support system in our alumni, and hope to expand that relationship to the advantage of future students that go through the department. Our goals for this project are to ensure that students are able to attend conferences and trips at no cost to them, including the registration costs.

None of the accomplishments from this year would have been possible without an amazing executive board. The executive board put in many hours of effort, worked extensively with the MSE department, Ames Laboratory, companies around the mid-west, Iowa State University, and schools around Iowa in order to provide the best experience to the students in the chapter and future students in the state. Their leadership, dedication and hard work gave students the opportunity to find and develop their passion for materials science and engineering, as well as act as inspiration to many to get involved and continue this chapter's tradition of excellence.

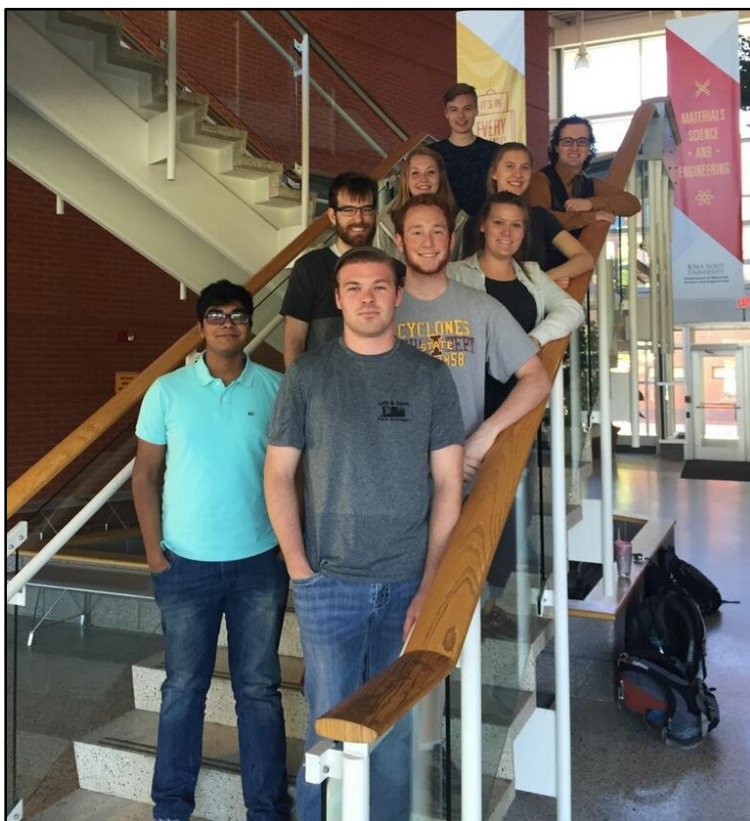


Figure 1: Student officers. Front row (L-R): Leander Mascarenhas, Andrew Temple. 2nd row (L-R): Kyle Miller. 3rd row (L-R): Jacob Sporrer, Elena Ewaldz. 4th row (L-R): Rebecca Whitesell, Catherine Meis. 5th row (L-R): Matthew Klocke, William Warfel.

Programming

ISU MA programming had an exceptional year. Branching more heavily into the career development area, students were exposed to many opportunities through which they could network and connect with professionals, professors, and other students. Additionally, the efforts to strengthen the partnership between the department and the club continued from previous years and were met with great success. Through these events, members gained insight into a side of materials science and engineering not attainable through the classroom.

At the request of students from last year, monthly meetings were held the first Tuesday of each month, as well as a social event or activity on the third week. At these meetings we conducted club business and promoted different events and activities. These meetings allowed the club to receive student feedback and actively work to improve club activities. At the end of each meeting, important information was emailed out to the student body with the meeting slides attached.

These meetings always ended with either a guest speaker or club activity. Speakers included other club representatives, professors, industry contacts, and campus officials. Included in this year's list of speakers were Dr. Alex King, current director of the Critical Materials Institute, who spoke about the materials found in the many guitars of his guitar collection, Kara Lind, a Ph.D student with Dr. Ludoviko Cademartiri, spoke about her research involving the use of Legos to assist in engineering specific plant behaviors, Dr. Chunhui Xiang, a professor in Apparel, Events & Hospitality Management, who spoke about her research with nanofibers being engineered to allow certain properties to exist in clothing, and Dr. Kristen Constant, the Materials Science and Engineering department chair, who spoke about the importance of professional societies like Material Advantage and how it can positively impact a person's career. An alternative to guest speakers were different activities that ISU MA hosted as a way to provide an informational and fun experience to organization members. These activities included a competition for making the strongest unit cell and various information nights (specialization night, graduate student panel, etc).

For many students, the decision between graduate school and industry can be very difficult, so this year ISU MA introduced a graduate student panel for members to attend. This panel included four graduate students, each with a different background, whom students could ask questions and gain information from. Three students were ISU alumni who currently work in conjunction with Ames Laboratory, and the fourth is an incoming graduate student from another university who works within the MSE program at Iowa State. Students were able to learn about what motivates students for graduate school, different paths that can be taken to get there, and what ultimately led to the decision between pursuing a higher degree instead of industry. Member feedback was very positive from this, and the executive board plans to increase participation and diversify the graduate student panel in the future.

One of the traditions that ISU MA has continued is Specialization Night. The MSE department has three specializations, metals, polymers, and ceramics, students are able to choose. This event was hosted to help students learn more about the specializations themselves, as well as the courses and professors who teach them. Dr. Scott Chumbley (metals), and Dr. Pratik Ray (ceramics) spoke on behalf of their respective specializations, while students (and officers) Kyle Miller and Jake Sporrer discussed the polymers specialization, and the courses involved with what was the electronics specialization. Students were also able to learn more about how those courses reflected in work within industry, academia, and research.

ISU MA was able to provide students the opportunity to tour 5 different facilities covering a range of work that students can go into. By traveling with MA, students were able to meet with leaders in industry as well as learn more about what kind of work the companies. These were facilitated through the programming chair who contacted companies around the mid-west and worked to provide students the best opportunity possible.

This year ISU MA was able to take 15 students to Columbus, OH for the 2015 Material Science and Technology conference. Through donations, funding from the Engineering Student Council, the travel grant provided by Material Advantage, and money raised through pizza sales, the 15 students who attended did not have any cost other than the registration fee, food, and any other personal expenses. Because of the low cost that individual students would be responsible for, students who would otherwise have been unable to go due to monetary constraints were able to attend. Students that attended had the opportunity to network with professionals in research and industry, as well as attend technical talks covering different areas of research and technology.

In the spring semester, ISU MA sent 5 students to Washington D.C. for Congressional Visit Day (CVD) with Dr. Iver Anderson. This opportunity for students was in large part due to the travel grants provided by ACerS, money raised by the fundraising chairs, ESC funding, and a donation made by the department in the early portion of the spring semester. While there were quite a few students who were interested in going, attendees were selected based on an application process to ensure good representation with a variety of technical experience backgrounds and also age differences to involve both seniors and underclassmen. Three seniors, each of whom were very active in different areas of research and industry work, and two sophomores also involved in multiple areas of research, attended. Through careful planning, attendees were able to meet with all of the Iowa representatives and both Senators as well as a representative from Colorado and Minnesota. Students were able to discuss the value of STEM funding, and how it has positively impacted their experience with school and professional development. This was an amazing opportunity for students that allowed them to experience life at Capitol Hill as well as meet and network with Iowa's delegation in Washington D.C., and a valuable chance to learn and understand how government funding works and directly our careers.

Career Development

Our chapter's goal continues to be to provide students in the department opportunities to expand their professional network, and learn more about the different areas of work that Material Science and Engineering students can work in. To that end, several events and opportunities for students were scheduled for the academic year covering topics for those interested in research as well as those interested in industry. Through these opportunities, students were able to gain and develop important career skills.

During the fall and spring semesters, ISU MA hosted a resume review leading up to the Engineering Career Fairs each semester. This provided students an opportunity to look at different resume options, discuss what information is important to include on a resume, and work closely with students who have had internship or cooperative education experiences with companies. Having these discussions helped students refine their resumes and the club received very good feedback from those who participated.

One of the primary career development that ISU MA provides students is attending the MS&T conference. This year 15 students were able to travel to Columbus, OH free of charge. Students were able to create their own schedules based off of the different technical talks they wanted to attend and meet with professionals in different areas. For the duration of the conference students were able to learn more about a variety of new and familiar areas of research as well as learn more about possible career paths of interest.

This year ISU MA was able to provide students an opportunity to attend 5 different industry/research experiences, as well as meet and talk with an ISU alumni who works at Micron Technologies. This year's tours were at Danfoss in Ames, IA; AK Steel outside of Columbus, OH; Medtronic and 3M in the Minneapolis/St. Paul, MN area; and Ames Laboratory which is on the Iowa State University campus. These opportunities gave students the chance to see different processes and talk with professionals from different companies.

For each MA meeting, a speaker or activity was planned following the general meeting notes. These speakers were chosen as a way for students to informally talk about research with leading professionals at Iowa State. The alternative activities were focused more on hands-on science activities or panels. These different meeting events provided students an informal networking experience, and often time resulted in increased interest in a variety of research fields.

Service

ISU MA's commitment to the community continues to grow and develop. By hosting 21 outreach events, and introducing new volunteering activities around the community to students, the service aspect of the organization has grown. The outreach program generally focuses on students in the k-12 range, and involves scientific demonstrations performed in person. While the outreach program continues to be a strong factor in ISU MA's community involvement, the introduction of club-volunteering events was also introduced this year for members. These events helped the Ames community and ISU campus, and provided students a chance to give back.

The outreach demonstrations was expanded this year and includes, but is not limited to:

- Melting a penny on a ceramic tile to demonstrate thermal insulation
- Pulling a glass fiber to explain glass manufacturing and fiber optics
- Heat treatment tool steel rod to produce martensite and tempered martensite, an excellent demonstration of metallurgy and processing as well as a hands-on demo
- Applying magnetic fields to ferrofluid to demonstrate magnetic properties
- Dropping a magnet down PVC and copper pipe to demonstrate eddy currents
- Comparing a cross-linked and uncross-linked rubber ball to show the effects of polymers processing
- Showing the shape memory effect of nitinol wire
- Freezing a racquetball in liquid nitrogen to demonstrate the glass transition temperature
- Breaking a sheet of tempered glass after standing on it to demonstrate how thermal processing creates a strong outer layer but a weak inner layer
- Two different melts welded together (bimetallic strip) to show different coefficients of thermal expansion and applying it to technology used today

These demonstrations continue to be both educational and entertaining for students of all ages. Plans are in place to further develop the kit through a partnership with the Ames Laboratory.

This year, ISU MA participated in 21 demonstration events this year. These events included presenting in front of packed auditoriums, to small classrooms, and showcased booth presentations. Because of the continued tradition of excellence with Iowa State University and local communities, ISU MA was invited to multiple events. Due to the reputation of the program, we were able to reach students across the state of Iowa.

In order to expand our outreach program, Rebecca, a student who was very interested in the outreach positions planned, organized, and implemented her own outreach training session. She went to different department classes and invited students to attend this training. At the session, students were trained by Dr. Lawrence Genalo, a veteran outreach demonstrator, Rebecca, and two other students who were very active in outreach. From this training, 12 students signed up to be members on the Outreach Team.

As noted early, the ISU MA chapter also had a stronger presence in the volunteering community. While continuing our yearly support of Iowa's Youth and Shelter Services program, where students purchased gifts for a family for the Christmas holiday through MA funds, members also assisted in campus and Ames Laboratory volunteering activities. Some of these activities included assisting with the Student Body "CyServ" week with a variety of different projects, and helping Ames Laboratory host its annual National Science Bowl competition for schools in Iowa. These opportunities gave students a chance to give back to the amazing community at Iowa State and in Ames.

Social Activities

This year, ISU MA hosted 24 events, a record number for our organization. With the goal of increasing departmental student participation and strengthening the excellent relationship between the student body and the faculty/staff, our events were all-inclusive to undergraduate students, graduate students, faculty, staff, and alumni. These events were:

- *Fall Kickoff Rally*: Co-hosted by the MSE Department and the learning community, MA purchased shirts and provided snacks.
- *Resume Review*: Upperclassmen with industry experience reviewed resumes of current students to provide feedback before career fairs.
- *Friday After Class (FAC)*: All-you-can-eat pizza and drink social held on the last Friday of every month at Pizza Pit, a local pizza parlor. Aimed to give students a chance to unwind after a month of hard work. Free FAC (normally \$3 for member and \$5 non-member) was offered to those who assisted in Outreach and Fundraising events.
- *Movie Nights*: Partnered with the learning community to encourage interaction between students.
- *Game Nights*: Board games, video games, and snacks were provided to students as they had a night of fun.
- *End of Year Picnic*: ISU MA provided burgers and hot dogs for students at the end of the spring semester to celebrate the end of another excellent year. Attendees also brought different games and activities.
- *Fall Banquet/Winter Bash*: A new event to mark the end of the Fall semester. Faculty, staff, students, and alumni joined together to celebrate the community that Materials Advantage has built for our department.
- *MSE Trivia Night*: This event kicked off the spring semester and was co-hosted with the learning community and department. The event featured trivia questions about the department and materials engineering.
- *Specialization Night*: This event was combined with a general meeting. We invited faculty members and upperclassmen to talk about the specialized fields in materials engineering, particularly their experience studying and researching in their respective fields. The upperclassmen talked about their experience in the courses.
- *Intramurals*: MA organized teams for intramurals hosted by Recreation Services; the sports we participated in this year were Battleship H2O, Team Bowling, Coed Volleyball, and Coed Broomball.
- *Kaleidoquiz and QuickyKwiz*: MA organized teams for the 6 hour and 26 hour long trivia events hosted by KURE 88.5, the ISU student radio station.
- *Finals Week Donuts*: In order to welcome students to the spring finals, MA purchased donuts and coffee for the students and faculty.

These events were ways for students to meet each other outside of the academic setting, as well as enjoy some time with faculty and staff. Many times at these events students are introduced to faculty members who they later have a class with or do research for. By hosting events, ISU MA

has been able to encourage a stronger relationship amongst the student body and the department, which helps serve to improve the sense of unity.

Chapter Management

This year's success, as always, is attributed to the amazing chapter management that ISU MA has. The faculty and staff members within the department have always gone out of their way to help ISU MA with whatever it can. Through this, students who are in officer positions are able to work closely with highly successful individuals, and that relationship continues to prove to be great beneficial. It is our belief that the support and encouragement of the department has positively affected the ISU MA leadership, and through that leadership the sense of responsibility and pride within the organization has strengthened.

The Iowa State University Materials Advantage Chapter offers many different areas for students to participate in. These areas include, but are not limited to, outreach, fundraising, social activities, and programming activities. In order to maintain a high level of efficiency with planning and administrating these events, the ISU MA executive officers met twice a month. These meetings were designed to discuss goals, progress, and plan the events, activities, and meetings. In addition to the mandatory Chair, Vice Chair, Treasurer, and Secretary positions, ISU MA has continued on with the implementation of two fundraising chairs, two outreach chairs, programming chair, events chair, webmaster, and historian. To the benefit of the outreach chairs, a new Outreach Team was created to assist in the many outreach opportunities that are presented. These positions have assisted in the expansion and growth of the ISU MA chapter. This year at MS&T, nine of the executive officers were able to travel for the conference. Of those nine, eight attended the Chapter Leadership workshop that was hosted, and the other executive officers attended the leadership banquet for the Keramos organization. Both of these events were very helpful to officers as a way to discuss and generate new ideas for officers to take back to their own chapters.

This year, slight alterations were made the Chair and Vice Chair (referred to as President and Vice President) duties. As a way to more evenly distribute the work, the President worked as the liaison between all external bodies to the club. This included Iowa State University, Engineering Student Council, alumni, and any university, company, or National organization wanting to get in contact with ISU MA. The President conducted the meetings, made travel arrangements for MS&T, and worked closely with the Vice President.

The Vice President was responsible for overseeing the executive board, working with the department, and acting as the go-to person for the student body. Through this, the Vice President was able to meet and work very closely with all of the executive officers, and provide assistance as was needed for the different positions. In the event of the President being unavailable, the Vice President would run the general meetings, and activities.

The Secretary had the responsibility of taking notes during the meetings, advertising meetings, events, and activities, and was the main contact from the club to the student body. A new ISU MA account was created which will allow students in this position in the future to maintain

contact, manage an online calendar, and receive important emails. The secretary created and distributed fliers throughout the MSE building, and provided significant assistance to the President and Vice President.

The Treasurer was responsible for managing the ISU MA accounts through Iowa State University. This position maintains the account sheets and balances the checking and credit card accounts. The treasurer also assisted the fundraising chairs in getting purchasing cards and solicits allocations from the Iowa State University Engineering Student Council. Once a month, the treasurer reported the balance of the account to the executive board.

The two Fundraising Chairs were tasked with raising money for the club to spend on activities, outreach, and travel. This was done primarily through the weekly pizza sales that they organized and oversaw. These sales were done in the Hoover Hall atrium, which is the Materials Science and Engineering department building on campus. The chairs worked with Jeff's Pizza Shop, a local pizza parlor in Ames, to arrange a special deal on pricing to maximize the club profits. By organizing student members to help with pizza sales, the two chairs successfully made sure there were plenty of volunteers each week. In addition to the pizza sales, the two officers were also responsible for purchasing food for the general meetings. Each week, money that was raised from sales was submitted to the treasurer to be deposited. Without the amazing effort and dedication from the fundraising chairs, ISU MA would not be able to be as successful as it has been.

The Outreach Chairs are responsible for organizing the large number of outreach demonstrations done each year. The two officers coordinate with the hosts and find trained volunteers for the events. These are two of the busiest positions within the organization, and through the addition of the Outreach Team, it is believed the responsibility can be delegated amongst a larger group of people run by the outreach chairs. The Outreach Chairs this year provided mentorship to the club's first shadow-position who was later elected into an outreach position. Through those efforts we believe the outreach program will be able to excel and reach new growth.

The Programming Chair arranged speakers and activities for meetings as well as schedules industry tours and was instrumental in the planning and organization of organization trips. Through the Programming Chair's hard work, four speakers, a guest presenter from micron, five industry tours, two panels, and a variety of activities were planned for this year. These opportunities were of great benefits to students, and helped provide insight to future careers and goals.

The Events Chair worked to organize social events for the chapter. This year there were 24 events hosted by ISU MA, an all-time high for the organization. These included the recurring "Friday After Class", intramural sports teams, and coordination with the programming chair for different professional events. The introduction to the Fall Banquet/Winter Bash was well-

received, and through the improved utilization of the chapter's Facebook page, an increase of media presence really helped with getting students at events.

The Historian and Webmaster positions are responsible for taking pictures and club events and maintaining the club website. The historian takes pictures of the officers and attends events and meetings to keep a record via pictures. Through their efforts, those wishing to contact the club for outreach opportunities and other business have been able to do so by using the proper channels for communication. This year, a new website was created and will be worked on through this incoming year, to optimize what information is available, and improve user experience.

Each year, officers are elected through a majority vote at the April general meeting, which is the last meeting of the semester. Prior to the meeting, information is sent out to the department with descriptions of the officer positions. This allows students to have time to learn more about the positions, and prepare a short speech of why they would like to be elected. For those students not able to attend the meeting, an *in absentia* letter of intent can be submitted to be read at the general election.

Following elections, a transitional meeting is scheduled so current officers can walk the new officers through their position. This meeting is crucial for a smooth handoff of responsibilities from year to year. Officers are tasked with preparing notes for the new students with details about what they did that year and any suggestions they have for the future. By having a variety of lowerclassmen and upperclassmen, new members are able to rely upon veteran students to assist with further questions.

By maintaining excellent records of the year's activities, the executive board is able to refer to previous year's notes for assistance. These include budget overviews, outreach schedules, fundraising records with food purchases and notes from general meetings, calendars, etc. This information is shared with incoming officers for reference.

Our chapter maintains a website at ma.engineering.iastate.edu. The information from this website is being incorporated into a new website linked through the College of Engineering, however for now the website maintains the relevant information regarding the club. This website is a great way for those interested in outreach to connect with the organization. Through this website, students are also able to request to join the organization.

Our general meetings and club events are typically very well-attended. General meetings had an average of 35-45 students this past year. Friday After Class events saw an average of 20 students, and the different events had between 10-25 students attend. The club was able to sponsor many intramural teams throughout the year as well as proudly host 21 outreach events. This past year was a very strong year for ISU MA, and we were proud to continue on the club's tradition of excellence within the department, university, and state.