



**PennState**



# PENN STATE MATERIAL ADVANTAGE

## CHAPTER OF EXCELLENCE APPLICATION

May 1, 2017

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## Chapter Overview

The Pennsylvania State University's Chapter of Material Advantage is comprised of over 100 undergraduate student members. Our chapter's mission is to provide opportunities for members in all areas of materials science and engineering. These opportunities include professional development, industry and research exposure, and community building. The chapter is run by nine officers (president, vice president, treasurer, secretary, class representatives, outreach chair, and a social chair) who work together to maintain chapter records as well as plan and execute a wide variety of events. Over the past year, we have established ourselves with multiple local organizations promoting STEM outreach as part of this initiative, and such events, in addition to all other chapter events, are detailed in this report.



From left to right: Victoria (treasurer), Rachel (chair), Jacob (secretary)



From left to right: Rachel (chair) Elizabeth (treasurer of karamos), Courtney (jr rep) Isabelle (vice chair), Victoria (treasurer) Catherine (secretary of karamos)



Nicole Kirchner (sr rep)

### **2016-2017 Officers**

President: Rachel Sherbondy, Vice President: Isabelle Gordon, Treasurer: Victoria Christensen, Secretary: Jacob Cordell, Outreach Chair: Katy Gerace, Social Chair: Chris Edie, Sophomore Representative: Andrew Schwartz, Junior Representative: Courtney Mench, Senior Representative: Nicole Kirchner



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To the Material Advantage Student Chapter of Excellence Selection Panel:

I am writing in support of the Penn State Chapter of Material Advantage for the Chapters of Excellence Program. I have been teaching and interacting with undergraduate students in the Department of Materials Science and Engineering at Penn State for 9 years. Although I have just recently moved into the role of faculty advisor for the undergraduate Material Advantage group, I have been thoroughly impressed over the last several months as I watched their leadership group in action, witnessed numerous professional, outreach, and social activities they participated in; and came together as a group to experience the best of material science as undergraduates.

I could use this letter to detail all the wonderful and impressive activities the group organized and implemented throughout this past year; however, I will touch on those only briefly as I believe what truly sets this MA Chapter apart is the community they developed with one another at Penn State, their ability to work together, volunteer for numerous activities on campus and in the community, and the exemplary leadership in the group. I watched the President, Vice President, Secretary, Treasurer, and Student Chair Reps organize and run professional meetings (including a trip to MS&T '16 and numerous on-campus professional speakers), society meetings, fund raising events, large social events (i.e. Blue/White Tailgate), outreach events at local elementary schools and community centers, and a few "de-stressor" activities for MatSE students. It is not simply the fact that they organized and participated in these activities, it is *how* they did it, with professionalism, unity, and grace.

For example, the students set up a demonstration table at a local elementary school for the "Centre Hall Elementary Science Night". I watched as they interacted with preschoolers through 5<sup>th</sup> graders with ease and joy, always smiling and always helpful. The children were in awe of the "science of materials" and were delighted with all the hands-on activities our MA volunteers let them do. The MA students answered their questions patiently and easily. One visitor from the community was so impressed with our group that she asked them to participate in her summer science camp. I was very proud of our group that night as I got to "watch them in action".

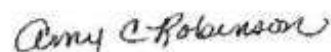
Additionally, I witnessed how they handled challenges and helped one another when needed. For example, a student took on the responsibility of handling the fundraising MatSE apparel sale this spring. Unfortunately, this student became completely swamped with class work and struggled immensely with meeting important deadlines and moving the sale forward in a timely manner. I witnessed the MA officers offer to help out in any way necessary and to help lessen the burden of this fundraising task by streamlining the process, coordinating orders, and distributing orders. When the situation was at its

worst, I still witnessed the president of our MA Chapter handle it with professionalism, strong leadership, and persistence to ensure the sale was a success and orders were delivered on time. I was thoroughly impressed with her actions as well as that of other group members that stepped up to help. It is easy to be successful when there are no significant challenges, but when a group handles a difficult situation with grace, poise, and success that truly speaks to the quality of a group.

Finally, I would like to touch on the "atmosphere" the MA Chapter here at Penn State has cultured. I have already stated that they work well together, but they also bring a sense of relaxed community to the Materials Science and Engineering Department. When students attend events (social, professional, other) hosted by this MA group, there is always a sense of welcoming and "we're glad you're here" to everyone that attends whether it is someone who comes to every single event, an occasional attendee, or if this is their first time visiting an MA sponsored activity. Everyone is greeted warmly and quickly feels part of this group.

In closing, I feel strongly that this group is well deserving of the Material Advantage Chapter of Excellence Award. Not only have they organized and carried out numerous professional, social, and outreach activities this year, which are detailed in their annual report, but they have done so with a level of professionalism, leadership, and grace that makes me proud to be their faculty advisor.

Sincerely,



Amy C. Robinson

Faculty Advisor  
Penn State Chapter of Material Advantage

## **Programming**

### **Industry Tour**

The annual industry trip is a three-day experience at the start of the semester which includes three prominent materials companies. This year 18 students toured GE Aviation, Nexceris and Nova Chemicals over a three day period in the Pittsburgh PA area. This tour provided insight into the manufacture process of fiberglass, among other materials, from raw materials through to thermal and mechanical testing. Each year, this trip serves as the first exposure to industry for many undergraduates. Some of these students are new to the major, and some have already been applying for internships at these companies for a year or two. Additionally, the companies on the trip each focused on one of the three main materials families: polymers, metals, and ceramics. All students gained a one-of-a-kind out-of-classroom educational experience from this trip.

### **Parents Weekend**

Parent's Weekend is held in the beginning of the fall semester to introduce families to the programs and facilities at the university. Within the Materials Science Department, this includes tours of the labs and facilities, hands-on materials demonstrations, and interactions with current students and faculty members. As MA members, we helped organize the tours and demonstrations. These included tours of the newly built Steidle building which is home to undergraduate and graduate research, as well as materials demonstrations involving highly absorbent polymers, ceramic tiles from spaceships, and shape-changing metal alloys.

Parent's weekend is a way to expose families of newly accepted students to materials research and give them a chance to speak with students and faculty members. It's an opportunity orchestrated by student volunteers in order to welcome new students and their families into MatSE.



### **Hosting the Engineering Career Resource Center**

Penn State Material Advantage hosted an event with the Engineering Career Resource Center (ECRC) on the Penn State campus. The ECRC is part of the Engineering College at Penn State, but the Materials Science and Engineering department falls under the Earth and Mineral Sciences College. The ECRC provides a venue for employees to meet students and students to

meet employers. They organize the information sessions and host a career fair that caters to engineering students. Employers also contact the ECRC recruiting materials engineers, but there has historically been poor participation of the materials department in ECRC events.

To remedy this, MA hosted a session with the ECRC in the materials building computer lab to advertise the online resources the ECRC offers and the upcoming events, including the engineering career fair in late January. Mr. Rick McClintic from the center worked with students to build online profiles to match to listed job opportunities, and shared resume tips with students. The event introduced students to many of the resources provided by the ECRC so that they could take advantage of them in the future.

### **Clothing Sale**

Each year the Materials Advantage Chapter offers a clothing sale to its members to raise money for the club as well as promote the Materials Science and Engineering Program at Penn State. This year, we had clothing options such as professional Polo shirts, Long Sleeve Button Downs, Quarterzips, and Sweatpants. This merchandise was sold to raise money for the club and for students to wear when they go to various conferences or Materials Advantage events to promote this chapter. The clothing sale is meant to provide professional attire and enhance the unity in the department.



### **Thank You Dinner**

At the end of the second semester, our Materials Advantage hosts a thank you dinner to thank all of the students who volunteered with our chapter for events in the past year. It is a nice way to conclude the year and talk with other students about what events they participated in over the year as well as their summer plans for internships or research. We have found that hosting a formal thank you event has increased retention in volunteers from year to year, and it makes volunteering more popular. We get *Qdoba* to cater our meal and it is a very fun and light environment to finish off the semester before finals and give seniors a last goodbye.



### **Morningstar Tour**

The Morningstar Solar home is a 100% renewable energy powered home on Penn State's campus, and the collaborative effort of numerous departments. Several MA members as well as some friends paid the home a visit, getting a tour from enthusiastic freshman studying geography. Originally built in 2007 for the Solar Decathlon, the house employs solar, wind and geothermal energy for power, and also has an amazing aesthetic that proves sustainable living can also be practical, elegant, and sophisticated. Renewable energy is a main sector in which many materials science students are interested, so the tour was a nice chance to talk about the applications that are possible with the knowledge gained in classes.



### **Career Development**



### Grad School Panel

The Penn State grad students delivered a talk on the topic of “Is Grad School Right for Me?” MA officers contacted Materials Research Society (MRS) officers and they organized a panel of grad students. The event began with a presentation delivered mainly by 1 grad student, although many offered additional opinions. The presentation was well organized, and it went over the expectations for grad school. This was a useful event because there is no other formal platform in which this



information is presented, and the grad students were very candid about the nature of grad school day-to-day activities. The presentation also covered tips for getting into grad school, which would be helpful especially for underclassmen looking to tailor their academic careers.

The event also offered a long question and answer session with the graduate students. This provided students a chance to ask specific scenario questions. The panel also was particularly useful as the grad students came from different academic and personal background, and were able to provide multiple perspectives on the various questions. At this event, we took advantage of the pizza grant through Association of Iron and Steel (AIST) to increase attendance.

### Guest Speaker, Nick Gilson

Nick Gilson, the CEO of Gilson Boards, came and spoke to Material Advantage for the second time about his story of designing and building snowboards. Nick gave an interesting talk about how he found himself building boards, the scientific discovery of aerodynamically and hydrodynamically optimized boards and the manufacturing process he and his company have acquired. Nick gave an inspiring and personable talk that encouraged students to follow their dreams. In the future Material Advantage would like to go on an industry tour of Gilson Boards, which is located only an hour away.



**Guest Speaker, Dr. Hickey**

Dr. Hickey is a new professor in the Material Science and Engineering Department. Dr. Hickey came in and spoke with us about his experiences at Widener University and the topics that he focused on while earning his doctorate in Chemistry at the University of Pennsylvania. He went on to work at the University of Minnesota to work with the assembly and phase behavior of ternary polymer blends. Thank you Dr. Hickey for speaking to Material Advantage, the students appreciate your time and your work!

**Guest Speaker, Dr. Zarzar**

Dr. Zarzar is a new professor in the Material Science and Engineering Department. She gave an interesting guest lecture during the spring semester about her work with chemo-mechanical actuation systems. It was a great event, as students got introduced to her and she got to see the students! Dr. Zarzar graduated with a Ph.D in chemistry from Harvard University. She then went onto MIT and earned a post-doc. Here she developed complex multiphase emulsions that are responsive to external stimuli. Thank you Dr. Zarzar for speaking to Material Advantage, the students appreciate your research!

**ARL**

The Army Research Laboratory (ARL) visits MA every spring and discusses the research division. ARL is the U.S. Army Research Development and Engineering Command. They conduct applied research on survivability, lethality, and human factor analysis at combat. This year MA hosted a luncheon for students and visiting ARL researchers. The ARL researchers are Penn State Alum and are always excited to see Penn State Students. Students enjoyed a great lunch and conversation regarding future careers and current research being performed at ARL.

## **Service**

### **Exploration U Bellefonte**

Exploration U is a family science night that has been hosted by the Bellefonte school district since 2009. The event promotes STEM education to young students and the community. Penn state graduates, undergraduates, and faculty offer hands on activities for families. MA students held demos for young children and families. We made “snow” from highly absorbent polymers, showed that a ball can bounce higher on metallic glass instead of steel which is due to crystal structure, and showed why shape memory alloys can lock into shape at certain temperatures. MA has been attending for several years and continues to make positive educational impacts on kids.



### **Nittany Greyhounds**

The Penn State Chapter of Materials Advantage visited Nittany Greyhounds, a local dog shelter, twice throughout the course of this academic year (once in December and once in February). MA members aided in maintaining the shelter and in interacting with the dogs it housed, which was a huge help to the staff. Participants were given background stories about each dog in the shelter before they were allowed to interact with them. Some members washed food bowls and cleaned the cages, while others had the opportunity to take the dogs on walks and play with them in the snow. These dogs were largely retired racing greyhounds, so their energy was high, which served to lift the spirits of the Materials Advantage members who they met.



## EMEX

EMEX (Earth and Mineral Sciences Exposition) is an important recruiting event that the Earth and Mineral Sciences College (EMS) organizes for prospective students and accepted students. These students range from high school juniors who are trying to decide where they want to go to college, to seniors who have already decided they're coming to Penn State. They visit Penn State campus with their families and engage in a series of information sessions, talks, and tours to learn about the majors and opportunities within EMS.



Visiting Materials Science students are invited to spend the night in a college dorm with a current student in order to learn about the college lifestyle and have a chance to engage in informal conversation about classes, professors, and research. After spending the night with their host, they attend a series of tours and information sessions with their families on Saturday. Our Chapter runs material demonstrations to expose students to the wonders of different material properties, as well as tours of Steidle building and the Millennium Science Complex (MSC).

Steidle building is a newly reopened building after years of renovation that contains classrooms, computer labs, and lab space for both undergraduate and graduate researchers. Students and families were led around the facilities and had a chance to hear from graduate students about the research they're performing. The MSC hosts internationally acclaimed

research facilities for undergraduate and graduate research and students as well as industry leaders. Visiting students are led around the nanofabrication lab that includes a cleanroom environment where nanodevices are synthesized, as well as the materials characterization lab. They are exposed to labs containing scanning electron microscopy, transmission electron microscopy, and x-ray diffraction. These tours provide helpful insight into the materials research environment at Penn State and how to get involved as an undergraduate.

### **Centre Hall-Potter Elementary School Science Night**

MA is dedicated to engaging in community events to bring awareness to the wonders of materials science. One way the Chapter does this is through science nights. The Centre Hall-Potter Elementary School Science Night is focused around educating young children and exposing them to hands-on examples of how science is used in real world applications. We helped children make their own “snow” with highly absorbent polymers and talked about applications for such hydrophilic materials in industry. This event helps bring awareness to materials science, educate children, and serve the State College Community. The event went so well that we were asked to come back and assist with summer science camps.



## **Social Activities**

### **Steidle Dedication: September 30, 2016**

Students, faculty, staff, alumni, and donors gathered to celebrate the ribbon cutting ceremony of newly renovated Steidle Building, the home of Materials Science and Engineering at Penn State. The theme of the building is “science on display,” exhibited through the use of glass throughout the building to see into laboratories, study rooms, and conference rooms (through frosted glass). A 50-seat computer lab on the ground floor has become a hub for undergraduate students to study for exams using the whiteboard walls and work on group projects. The large shared-space laboratories and graduate student offices foster collaboration between research groups and promote scientific discovery through communication. The ceremony allowed students to interact with alumni to hear stories of “Old Steidle” labs and offices as well as thank the faculty and staff that worked so hard to make the renovation happen. As students, we are extremely thankful to have state-of-the-art facilities to conduct research and complete our undergraduate degree with amazing opportunities to grow and develop in the Materials Science community.



### **Fall Socials**

Every term, the MA Social represents a time for everyone to come together purely to hang out and have a good time. It's also a great way for younger students to get to know older students and vis versa. Two socials were held in the fall at two different locations, ensuring everyone was able to join in on the fun!

### **Holiday party**

The MA holiday party was an event held in the last week of fall semester classes. The main goals of the holiday party was to help students to de-stress before finals week. Members contributed treats for the group, and holiday sweaters were encouraged. The meeting consisted of a list of the events in an early planning stage for the spring semester and a call for new ideas from members. The meeting provided an environment for members to bond before leaving for winter break. The homemade treats from members added a personal atmosphere and helped to draw in members.

### **Broomball**

Penn State MA hosted the annual broomball game at the Pegula Ice Arena. Broomball is a game played with sticks and plastic balls in tennis shoes on the ice. Very little skill is required, and all players slide around comically. The rules make it a very even playing field in terms of athleticism. The game was very casual, and the teams were rearranged at points to maintain equal opportunity. There is an aspect of team building as there are often many falls. Team members and opponents alike assisted others in returning to their feet. To increase the hilarity of the situation, the second half of the hour rented from Pegula was played with multiple balls. The ensuing game was more chaotic but enjoyed immensely. The game was an excellent chance to see fellow students in a casual setting and to work in teams.



### **Spring Social**

This spring the social took place on a chilly Friday in March. The low temperatures had no effect on the entropy or enthalpy of the social, however. The hockey team's victory against Wisconsin got the event off to a good start, and was followed by an evening full of chatting, singing, dancing, and playing games. The turnout was the best in recent history and a good time was had by all!

**B&W tailgate**

Each April, Penn State Football hosts their Blue and White game, which is a scrimmage among different teams made from Penn State players. Each year, MA partners with Keramos and the grad student organization MRS and hosts a MATSE tailgate prior to the blue and white game. This year there was food catered by *Hogfather's Old Fashioned BBQ*. Tailgating is part of the culture at Penn State, so it is natural for the groups to get together and tailgate, as many students would be doing anyway. Most of the time was spent catching up and some people played popular tailgating game, cornhole. Often times, recent alumni come back to visit for blue and white weekend, and the tailgate is the perfect opportunity for them to meet the current students. Students, faculty, and staff were invited and a great day outside was enjoyed by all.





## **Chapter Management**

### **Elections**

Elections for executive board positions were done in a general body meeting in March. Prior to that date, students interested in a position notified an existing member of their candidacy, and were told to prepare a short (2 minute) presentation of their qualifications. The elections began with the highest ranking officer (president) and worked down. Candidates that were not elected to a position were permitted to run for subsequent lower-ranking positions. Votes were taken on paper ballots and counted by graduating seniors on the existing executive board. The early timeline was critical so that new board members could assimilate and go to officer meetings to be introduced to their positions and the faculty adviser before the end of the year.

### **Recruiting Events**

Recruitment is done mostly through outreach to the MatSE department. Many events put on by MA are open for MatSE students that are not a part of the club, which introduces them to the benefits of membership. During the “Major Discovery Night” and EMEX hosted by the College of Earth and Mineral Sciences, MA always has a table and a poster to interest students. Also, during convocation at the beginning of the academic year, the chair always presents information about MA, which is especially effective with educating freshman and transfer students.

### **Web Management**

The website is managed by the social chair. It is updated each semester to keep a professional presence. Most of the event advertisement is done on Facebook, where the club has a group within Penn State’s group. The members can then see notifications about the time and place for general body meetings as well as reminders for due dates. Facebook provides a convenient platform as it is widely used and any member can post in the group.

### **Record Keeping**

The students on the executive board are all given editing privileges in a Google Drive folder. Here we store general body meeting PowerPoints, event detail write-ups, the executive board contact details, and copies of attendance sheets among other documents. The folder is accessible to the board members who need the information to organize events.

### Executive Board Organization

Executive board meetings occur every other week, and are typically an hour. At this time, the president and vice president develop an agenda and divide tasks up among the members. The faculty advisor is there whenever she can be, and provides invaluable insight. In addition to the agenda, officers are encouraged to bring questions or ideas to keep the club moving forward. The ample time spent in these meetings helps to keep the club moving forward and keeping up with events.

### Continuity of Excellence

Elections are typically held 6 weeks before the end of spring semester, which enables newly elected members to come to board meetings. They are generally given small tasks and partnered with their existing counterparts on the board to complete tasks. The early elections make sure that students do not come into the board not knowing what to expect, so that the quality of club events and meetings is maintained. Also, documentation is an important part of continuing excellence. The Google Drive that is maintained by the officers was reorganized this year to make it more user friendly for future years.

### Treasurer report

Date	Event	Description	Expenses	Income	Balance	Notes
7/1/2016					\$8,826.48	
7/2/2016	MS&T Travel	Funding from UPAC		\$6,100.00	\$14,926.48	
10/19/2016	New Members:62	Dues (\$10 each)	\$620.00		\$14,306.48	
11/3/2016	Meeting	Pizza	\$50.00		\$14,256.48	
11/7/2016	Dues to TMS	62 members (\$30 each)	\$1,860.00	\$1,860.00	\$14,256.48	Lost in mail
11/10/2016	Donations	Department Allocation	\$7,540.00		\$6,716.48	
11/9/2016	ArcelorMittal USA Inc.	Donation		\$3,000.00	\$9,716.48	
1/5/2017	Meeting	Pizza	\$45.00		\$9,671.48	
1/9/2017	ASM	2015-2016 Membership Reimbursement		\$660.00	\$10,331.48	

1/24/2017	MS&T Reimbursement	14 student conference registration	\$525.00		\$9,806.48	
1/27/2017	Broomball	Ice rink rental	\$220.00		\$9,586.48	
2/13/2017	Spring Merchandise	Quarter Zip Fundraiser		\$368.00	\$9,954.48	
2/20/2017	Merchandise	Clothing Order**	\$502.00		\$9,452.48	
3/30/2017	Dues to TMS	29 members (\$30 each)	\$870.00	\$870.00	\$9,452.48	Misplaced by TMS
4/19/2017	Dues to TMS	28 members (\$30 each)	\$840.00		\$8,612.48	