



University of Puerto Rico- Mayagüez
Material Advantage UPRM-Chapter
Chapter of Excellence Application
2018-2019 Annual Report

Submitted to ASM International on June 1st, 2019

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Material Advantage-UPRM Chapter

Chapter Overview

The Material Advantage chapter at the University of Puerto Rico-Mayagüez (MaAd UPRM) is proudly the only Materials Science and Engineering (MSE) student organization throughout Puerto Rico and the Caribbean. Since our foundation in 2007, we have received undergraduate and graduate students from the diverse programs in engineering and the sciences. For more than a decade MaAd UPRM has established itself and through networking with other organizations to serve the community and the university and to provide professional and academic development tools to our members.

This academic year 2018-2019 was one full of achievements. For the first time, we included in our board a position for graduate students to offer active participation to this group of members and have representation in the decision making of the organization. Thanks to the inspiring support provided by our advisor and members of our organization, the undergraduate certificate and the Materials Science & Engineering graduate program have increased their number of participants. During the academic year, we received alumni (former chapter members) as guest speakers of graduate and undergraduate seminars. Our members also represented us magnificently in several conferences such as MS&T, ERN, and TMS.

This year we restarted our MSE clubs called Bulldogs Club for middle and high school students, in three schools in the Mayagüez Municipality. For the first time and under the sponsorship of the Ceramic and Glass Industry Foundation (CGIF) and the Nanotechnology Center NSF-CREST II, we carried out three extensive outreach activities during the months of April and May. The first was a one-day STEM camp addressed to high school girls. Then, a group of our members, Nanotechnology Center staff, two UPRM professors (including our faculty mentor), and our officers visited the islands of Vieques and Culebra, two island municipalities to the East of Puerto Rico. We brought with us interactive MSE demonstrations for children and the community in general.

Every year, our officers work hard to plan activities and keep our chapter committed and involved in exciting engagements. After the vicissitudes that our university and Puerto Rico have faced due to Hurricane María, the aftermath and the economic downturn of the island, this year we have managed to stand up proudly and resume work to reach our goals as an organization and bring this academic year to a superb conclusion.

2018-2019 Chapter Officers



Claralys Hernández
Chair



Raúl Vega
Vice-Chair



Sandra Albarracín
Graduate Vice-Chair



Ángel Torres
Treasurer



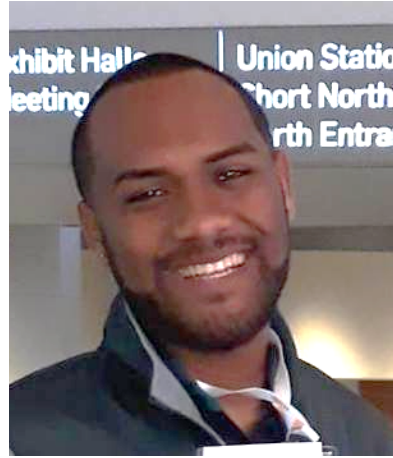
Keishlyann Báez,
Secretary



Carolina Ramos
Public Relations



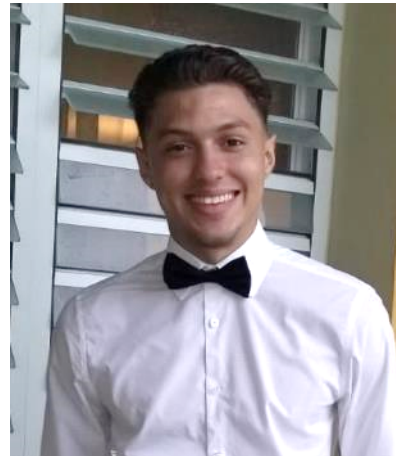
Amanda Quintero
Outreach Coordinator



Johnattan Díaz
Outreach Sub-Coordinator



William Crespo
Fundraising Coordinator



Amir Gómez
Fundraising Sub-Coordinator

Programming

During this academic year, our MaAd UPRM programmed several activities, workshops, and seminars related to Materials Science and Engineering topics. These activities are part of the intended educational experiences provided to our members and university community to develop of leadership skills, encourage participation in research projects, and prepare for a successful professional life.

September 18-20 | How to write a research paper seminar

Every year, our advisor Prof. O. Marcelo Suárez offers this seminar that summarizes in a simple way the areas and details that should be considered when starting to write a scientific article. The seminar was open to the university community

October 25 | How to land an internship

Our former vice-chair and graduating Electrical Engineering student, Nelson Sepúlveda offered this seminar based on his summer undergraduate experiences in five different sites: Teas Tech, NASA, Michigan State U., Georgia Tech, and UC-Berkeley. Ue provided guidelines to prepare a competitive internship application.



November 5 | Summer internships and graduate studies at Northwestern University

Liliana Hernández and Fernando Reyes, former members of our association and currently PhD candidates at Northwestern University, offered a seminar where they informed exclusively our members about summer internship opportunities and graduate studies at that institution.

November 16 | Lithium-air batteries with improved catalytic activity for electrical vehicle applications

This was in charge of Dr. Bilal El-Zahab. He is an Assistant Professor at Florida International University in Miami, FL. He is the director of the Energy Materials Lab at FIU and the Graduate Program Director responsible for recruitment, admissions, and assistantships for the MS and PhD programs in Mechanical Engineering and Materials Science and Engineering.

February 4 | Mendeley workshop

Mendeley is a free platform for the search and management of references. This hands-on seminar provided the necessary tools to start a Mendeley account and learn how to insert references to documents in different style manuals. This was in charge of Prof. Jaquelina Alvarez, coordinator of the university's Graduate Research and Innovation Center (GRIC).

February 8 | Getting a product to market

In this seminar offered by Eng. Aldo Briano, we were given a brief introduction about the Startups market. A Startup could be defined as an emerging business based on innovative ideas and with the vision of growing rapidly. Usually this type of business makes use of digital tools and technology for its development. Briano, who is an UPRM alumni, is co-founder of a Startup called Yiftee which is a platform for the purchase of electronic gift cards for small and medium businesses in the US. and Puerto Rico.

March 4 | Introduction to Matlab workshop

Our member, Juan Carlos Vargas (Mechanical Engineering doctoral student), who has vast experience with MatLab, offered this introductory workshop where participants had the opportunity to learn useful codes for the processing of images, generation of graphics, matrices, among others.

March 13 | Webinar: Measuring moisture-induced swelling of wood using small angle neutron scattering

Dr. Nayomi Plaza is our one and only "Nayo", former CREST Phase I student, an honor graduate of our Mechanical Engineering program, and former president of our Material

Advantage Chapter. She obtained her Materials Science doctoral degree from the University of Wisconsin-Madison and is currently at the Forest Products Lab of the US Forest Service. Nayomi was our president when the chapter received one of our three Chapter of Excellence awards. She is the 2010 TMS Light Metals Division Scholar. This seminar was offered online with the collaboration of the GRIC, and was part of the MSE Graduate Seminar course.

April 11 | 3D printing of concrete for Mars habitat/Macro and nanocharacterization of nanoreinforced concrete

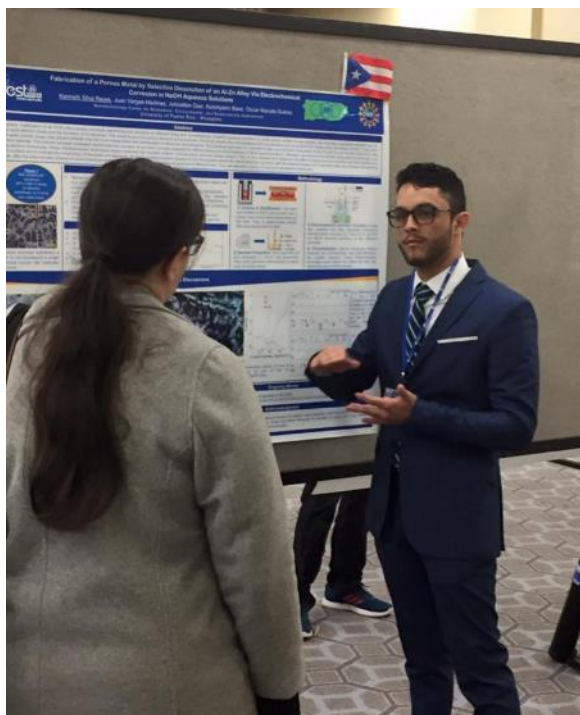
In the first part of this seminar, Raúl Marrero, PhD candidate of the Department of Civil and Environmental Engineering at the University of Northwestern, gave us a summary of his work in a project for the development of a house suitable for the Martian environment using 3D printers. Then, Marrero spoke about his research project, which uses these same technologies for the development of concrete reinforced with nanofibers and carbon nanotubes (CNTs). He was the top graduate of the Civil Engineering and Topography programs in 2016.

Career Development

Technical Meetings

MS&T 2018

MaAd UPRM sent four members to this conference held in Columbus, Ohio on October 14-18. They presented posters about their research projects and participated in various seminars and activities. Finally, in a private event they received our certificate as runner up (*Achievement Award*) of last year's Chapter of Excellence competition.

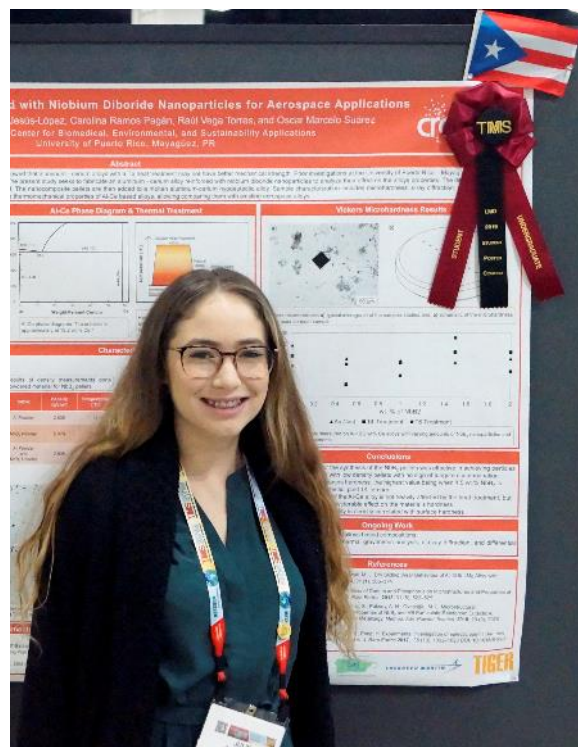


Emerging Researchers National Conference ERN (Feb. 22-24, 2019)

ERN is a national conference for undergraduate and graduate students who participate in projects funded by NSF. This year two of our members competed in the poster section. Also they had the opportunity to meet exhibitors from other academic, government, and business institutions with information about summer research opportunities, graduate school admissions, scholarships, among others.

TMS 2019 (March 10-14, 2019)

Five MaAd members attended TMS 2019 in San Antonio, TX. During these days, they were able to participate in networking activities, attend lectures and partake in the poster contest. Proudly, this year, Julie Colón, our 2017-2018 Outreach Coordinator won the Undergraduate Poster Award in the Light Metals Division.



Junior Technical Meeting and the Puerto Rico Interdisciplinary Scientific Meeting JTM-PRISM (May 4th, 2019)

JTM-PRISM is the largest scientific forum held annually in Puerto Rico. Students, professors, and professionals from all parts of the island meet to share their scientific findings and to keep updated about the progress in STEM research. This year this was held in our own campus. Five members of our chapter presented their work and some MaAd UPRM officers were part of the staff of the conference.

Service

For several years, our chapter has focused mainly on the area of service and outreach. This year we developed and collaborated with other organizations in a total of 15 outreach activities both on and off campus.

Campus Activities

9/9/2018 | Inauguration of the Thermal Processing Laboratory

We offered a free coffee break for all the visitors of the inauguration of the new Thermal Processing Laboratory located in the Stefani engineering building. This new lab, supervised by our faculty mentor, Prof. Suárez was funded by the Transformational Initiative for Graduate Research and Education, a US Dept. of Education-funded project. The lab is a research venue supporting some of our members' work in the development of new aerospace materials.



10/9/2018 | National Nanoday Celebration and Space Week

On that date we joined the Students for the Exploration and Discovery of Space (SEDS) association to celebrate the last day of the Space Week and the National Nanotechnology Day. In the student center of our campus we had information tables, interactive demonstrations about science, nanotechnology, materials and how these are used in space exploration.



10/12/2018 | Nanotechnology Center MSE Clubs Annual Meeting

The Nanotechnology Center CREST II is one of our biggest collaborators and allies. Annually, they hold a meeting of their MSE clubs in the Coliseum of our university. MaAd UPRM always are present as volunteers. This year we also provided refreshments to the 600 students from intermediate and high public school affiliated to the Center. We also guide the participants in the construction of balloon models of nanoparticles intended for cancer treatment in a large demonstration in the Coliseum.



2/1/2019 | Health Fair

The Student Association of Integral Health organized for the first time a health fair to which we were invited as collaborators to offer information about materials that are used for health and medicine applications.

Community Outreach Activities

Nanoadventures for Puerto Rico at Mayagüez Mall

In this activity, we joined the Nanotechnology Center as volunteers to carry out an educational activity to the community where we offered hands-on demonstrations about science and nanotechnology using Puerto Rico's tourist attractions as a theme. Thousands of people stopped by at our demonstration tables. The Mayagüez Mall is the largest commercial center in Western Puerto Rico.



Bulldogs Clubs

After Hurricane Maria, our Bulldogs clubs were affected by the lack of stable communications. This year, we resumed our activities in three schools where the clubs were created for middle and high school students. In total, they comprise about 60 students.

Two visits were completed per school, where scientific modules were taken to develop them in their classrooms. Within the activities the club members were introduced to MSE topics such as viscosity, elasticity, deformation, conductivity, among others. As well,

they learned about different types of materials like polymers, metals and ceramics. The reception of the schools was very pleasant, so we hope to increase the number of participants of our clubs for next year.



MaAd UPRM Reaching out to the Most Forgotten Communities

For several years, we had conducted our customary one-day Bulldogs Camp for high school students. This year, we decided to prepare a different proposal with our faculty mentor. We requested near \$10,000 from the Ceramics and Glass Industry Foundation (CGIF) for this feat. The project titled "Using Materials Engineering as a Recruiting Strategy to Engage Geographically-Challenged Female Students and their Communities" proposed the realization of two activities: the Zirconia Camp and Ceramics in Engineering Showdown in Vieques. Both activities would be developed entirely by MaAd officers and a few Nanotechnology Center collaborators. At the beginning of November 2018, the funds were approved, and we started preparing. During the process there were several changes that culminated in the realization of three activities (rather than two) with great acceptance by our target communities.

Zirconia Camp 2019

On April 6, 2019 from 8am to 5pm, our first Zirconia Camp was celebrated. The Zirconia Camp is named after one of the toughest ceramic materials. Women, as well as zirconia, are synonymous of resilience, as proven by Puerto Rican women after the Hurricane María. Historically, women have faced countless challenges to make way in STEM areas. Although in recent decades more women have joined, they still remain a minority. This activity was in response to the decline in the admission of female students in our Engineering programs during the past years.



Thirty-three girls participated in this one-day camp where they were given a complete educational experience focused on STEM areas. During the morning they attended lectures by female professors from our Engineering departments. They discussed challenges and opportunities in their fields. The participants also received ample information about the

admission process at the university and the requirements our programs. The majority of our Engineering programs are the most selective in all Puerto Rico and require competitive application packages.

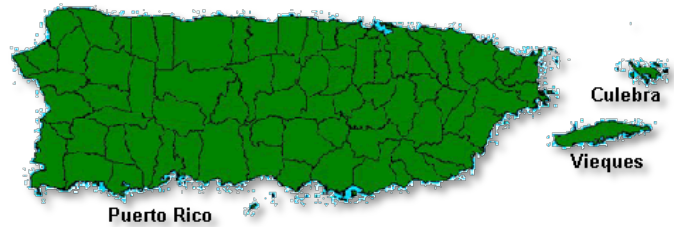
Then, with the collaboration of the Society of Physics Students (SPS) and the Optical Society of America (OSA), the participants were given tours through laboratories and interactive scientific demonstrations. In the afternoon the young women completed a scientific project mentored by female graduate students from our campus. Previously, the students had been sorted into five groups named after women pioneers in different STEM branches; each project was focused on the areas of study of these women. As mentioned, upon completion of the projects, the students were offered a talk by the director of the Admissions Office on how to prepare for the transition to college life. Finally, we had a closing activity shared with the parents of the students where they presented a scientific poster about their projects.





Ceramics in Engineering Showdown in Vieques

Vieques is one of the island municipalities of Puerto Rico. It is located at the east of the big island and to the North is Culebra. During the past years, the residents of these islands have been marginalized, the maritime transportation service is deficient, and they do not have the resources and opportunities like the rest of the Puerto Ricans. They were among the most affected population in the aftermath of Hurricane María. This is why we wanted to visit this town for the first time and to carry out a cheerful and educational activity for all children and people.



Eighteen representatives of MaAd UPRM including our officers, several members and support staff of the Nanotechnology Center and our faculty mentor moved to the island to carry out this activity. The town event was held on April 26 at the Municipal Coliseum Luis González Camareno. More than 120 people attended this activity including children, youth, and adults. We offered games, and experiments as well as simple and interactive scientific demonstrations.



One delegation from a local local school also stopped by and received information about our university programs.



Zirconia and Ceramics in Engineering in Culebra

After the activity in Vieques, we were delighted with the experience. For this reason, we set ourselves the task of preparing a similar activity in Culebra in a very short time (only three weeks) with the additional challenge that our semester was ending. Therefore, after finals, on May 23 we had our last outreach activity of this academic year. On this occasion, 14 MaAd UPRM representatives participated in this venture. The Ecological School of Culebra and its director opened the doors to us to carry out the activity for its students and community in general. At least 60 students and teachers gathered at our event. We also share information about our STEM programs and the Engineering early admission endeavor called R²DEEP (Recruitment, Retention, and Distance Engineering Education Project). We left plenty of information on fun house experiments with ceramics, Engineering admission requirements and R²DEEP in the school library to be distributed among teachers who could not attend the event.



Social Activities

8/28/2018 | Meet MaAd UPRM Info-table

The first activity of the academic year was an info-table to present the association to the freshman students and guiding them about the benefits offered by our organization.



9/13/2018 | New Officers Welcome Dinner

In this activity, the new members of the MaAd UPRM directive 2018-2019 were welcomed.

9/25/2018 | Student Organizations Fair

Annually, the Department of Social and Cultural Activities of our campus organizes a student organization fair aimed at new students. As a result of this activity we received several people interested in our organization and new members.



10/4/2018 | Company Night

The Company Night is an activity organized by the Placement Office as a preamble to the campus job fair. During the event, the student organizations share with representatives of the industry (recruiters) in a pleasant evening and later at dinner. We showcased the dozens of First Prize ribbons, our member won during the Annual Meetings of TMS and MS&T.



12/6/2018 | Induction Ceremony and End of Semester Party

This year, the induction ceremony and the end-of-semester party were held together near the end of the fall semester. There the membership of the new members of the organization became official through an oath. The rest of the activity was dedicated to the participants sharing and celebrating another successful conclusion of a challenging academic semester.

3/28/2019 | E-Week Student Organizations Chairs Formal Dinner

The Student Council of the College of Engineering organizes the activities of the Engineering Week. The last day of activities is a dinner with all the chairpersons of the engineering associations where they recognize for their leadership.

Chapter Management

Chapter Organization and Procedure

Weekly Officers Meetings

Every Monday the officers meet to plan, organize, and carry out other ancillary chapter activities. They develop from the bottom up new fundraising activities, outreach events, career development activities, social events, and prepare new proposals to obtain additional funding.

Elections

Each year our chapter holds a nomination process during a general meeting where members can nominate and become nominated to any officer position. If the member accepts the nomination he or she must presents a little talk providing the reason why the nomination is accepted. The votes are made on paper or electronically and only members have access to the voting process.

General Meetings

Every semester general meetings are held to provide an update of the upcoming activities and engages the general membership in the planning and development of those events. It also serves to let members get to know each other and share new ideas.

Officer Duties

Chairperson

The president or chairperson is ultimately responsible for all chapter activities. He or she interacts with the national organizations and the College of Engineering to which the chapter is ascribed. He or she must coordinate and delegate responsibilities in writing proposals and soliciting additional funding.

Vice-Chair

He or she must assist the president or in the absence of the Chair he or she must assume the position. Duties include planning outreach activities as well as help the Chair in writing proposals and soliciting additional funding.

Graduate Vice-Chair

The Graduate Vice-Chair is in charge of scheduling the seminars and workshops that will be offered during the year in conjunction with the Graduate Program in Materials Science and Engineering. This is facilitated by the fact that our faculty mentor is also

the coordinator of the graduate program. The officer becomes the liaison with the community of graduate students and prepare activities of their interest.

Secretary

In addition to keeping a written record of activities and meeting minutes, the secretary must send via e-mails the minutes to the members. The secretary must maintain a detailed record of all the activities.

Treasurer

The treasurer maintains petty cash and takes care of deposits from every fundraiser. He or she assists with preparing funding proposals and helps to prepare an annual budget and then adjusts the budget accordingly as the year progresses. Also, the treasurer must keep record of every transaction in our university account as well as a record of all scholarships received by the members. The treasurer and the faculty mentor are the in charge of a bank account of the chapter in the Popular Bank of Puerto Rico.

Public Relations Officer

In addition to keeping our bulletin board and our Facebook page updated, the public relations officer must follow the university instructions to reserve meeting rooms where our activities will be held as well as to prepare the promotion of all public activities of the Chapter.

Outreach Coordinator

This officer is in charge of organizing and keeping track of every outreach activity held by the Chapter and of informing about any aid needed in order to fulfill the steps needed to carry out the activity.

Fundraising Coordinator

He or she is in charge of organizing all Chapter fundraising activities. It is in charge of finding and proposing innovative ideas to raise funds for the Chapter.

Recruitment Efforts

At the beginning of each semester, the officers as a team are in charge of preparing promotional material and activities aimed at recruiting new members, especially freshmen students. This year we participated in the Student Associations Fair and we had an information table in the lobby of the building where the Materials Science and Engineering department is located. From these efforts we were able to recruit around 15 new members.

Fundraising

Fundraising activities are an important part of our chapter. With the money that is collected, materials are acquired for outreach activities, social events, and technical meetings expenses.

Every year we sell our famous zombie shirts, as well as food and sweets. These are several of the alternatives that we have adopted to obtain immediate funds. On the other hand, the application of funds and scholarships of governmental and private entities serves to cover larger expenses. This year CGIF granted us \$9,975 for the expenses of our Zirconia



Camp and our activities in Vieques and Culebra. In addition, we received two \$500 travel awards conferred to two of our members to participate in MS&T and TMS.



University of Puerto Rico - Mayagüez
Nanotechnology Center for Biomedical, Environmental and Sustainability
Applications - Phase II

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June 1, 2019

Drew Fleming
Material Advantage Student Chapter Program
ASM International
9639 Kinsman Road
Materials Park, Ohio 44073-0002

Dear Mr. Fleming:

The main purpose of this letter is to state that the attached information provided for the *Student Chapter of Excellence Program* report by the University of Puerto Rico – Mayagüez Chapter of Material Advantage is thorough, truthful, and representative of the endeavors of our brave student organization. The annual report presents activities and experiences of our chapter from August 15, 2018 through May 30, 2019.

Moreover, I was present in most of the reported events and, thus, I can authenticate the commitment shown by the chapter members and their relentless effort that facilitated the success of all said activities. The chapter was particularly successful in their involvement in outreach activities where our chapter members helped foster the synergy between the chapter, our NSF-funded Nanotechnology Center, and our fledgling graduate program in Materials Science and Engineering. The broader impact is reflected by the Chapter's undertakings involving public schools targeting female students and engage them into considering a career in Engineering. That is the case of the one-day *Zirconia Camp*, for which I was fortunate to secure funds from the Ceramic & Glass Industry Foundation (CGIF). The involvement of low-income communities, a dire social context in Puerto Rico, particularly after Hurricane María, has been the driving force to motivate our members to engage those young minds into engineering and, eventually, to consider an advanced education in areas related to materials. Further, as indicated in the enclosed report, our Chapter members received several awards that manifest their strong background in Materials Science.

At this point, I must underscore the spirit of this outstanding group of Puerto Rican students. As you know, Hurricane María devastated our island on September 20, 2017, a day that will be forever remembered by these young minds. As our members come from all over the island, everyone was affected by this hecatomb, triggered undoubtedly by global warming. Puerto Rico was slashed from the Southeast to the Northwest by the storm affecting particularly the Eastern and mountainous region. To the East, Puerto Rico has two small island municipalities, Vieques and Culebra. Both communities have suffered much because of the economic downturn of this US Commonwealth and the destruction caused by the hurricane. On top of that, almost 1/3 of the paradisiacal Vieques is off limits as a result of unexploded ordinance and contamination left the US Navy when they abandoned their base in the mid 2000s. Nowadays, the cancer incidence in the island is amongst the highest in the nation. Yet, my fellow Puerto Ricans stood up and recovered always forgotten by the mainland. Such disgraces (mostly caused by humans) helped me realize how such outstanding human qualities in Puerto Rico are lacking in my fellow American citizens and the federal government, which continues castigating us through unfair laws and oblivion. Yet, here we are, standing tall and stronger than ever.

The annual report left out more small stories of heroism, of sacrifice of these young students. This island deserves better, much better from the mainland. Thus, our members deserve being recognized by Material Advantage for their commitment, their sense of community, their compassion.

I urge you to take these words into consideration when you decide about your Chapter of Excellence award. Next time you sing “home of the brave” remember where the ‘brave’ are on this forgotten US Commonwealth.

In closing, our Material Advantage – Mayagüez Chapter has my full support for the next year to continue realizing remarkable, high impact projects and events. If you require any additional information regarding this letter, please do not hesitate to contact me at your earliest convenience.

Sincerely,

O. Marcelo Suárez, PhD, Fellow of ASM International
Material Advantage Chapter Faculty Mentor
Materials Science & Engineering Graduate Program Coordinator
NSF/UPRM Nanotechnology Center Director
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