

## **Growing with Tren Urbano**

The Alternative of Integrated Transport is a new transportation system that will efficiently combine the AMA transportation service, vehicles of Tren Urbano and the Minibus system. The San Juan metropolitan region is a densely populated urban area with heavy traffic congestion. More than 1.3 million residents of Greater San Juan make about 3.2 million trips daily, producing traffic conditions on expressways and major roads that vary from sluggish to standstill much of the time. The new transportation system will alleviate this congestion and manage anticipated future increases in traffic level. As part of this system, the Professional Development Program was established with the purpose of developing future professionals trained in the principles of Systems of Integrated Operations.

I am very interested in participating in the Professional Development Program because it is an opportunity to help create a better future for Puerto Rico while learning about Operation Processes and Integration of Systems. In this program I will have the opportunity to exchange educational experiences with professionals of different fields. I will develop skills needed to work with a diverse of professionals including gliders, engineers, psychologist and business administrators. More importantly, I will contribute to the actual development and maintenance of a system that I believe will be of great benefit to everyone and to the environment.

The topic of research that I chose is ***Strategies for Future Developments Around Tren Urbano Stations***. I chose this topic because it is important to efficiently develop the areas surrounding the Tren Urbano stations without negatively affecting their use by travelers. It is important that future projects do not limit the station areas or prevent the stations from being extended when necessary. In addition, future developments have to avoid creating additional traffic congestion near the Tren Urbano stations. Any future development will have to include construction of parking and pedestrian areas that are essential for the benefit of the users. For added convenience, bathrooms and food stands can also be constructed around the stations. If future developments cause problems in the areas surrounding the stations, travelers will not use the Tren Urbano system often enough to reduce the heavy congestion currently in San Juan. All future plans for developments will have to treat the Tren Urbano stations and its surroundings areas as a complete system: neither part can be ignored. Acquiring research skills specifically in this area will help me and other future civil engineers make better decisions about the transportation system in Puerto Rico.

My experiences in class projects have helped me to acquire many skills that will be of benefit in this research topic. My first project was the study of premature damage to the roads in Puerto Rico. Anibal Ramírez assigned this project in the course "Political Science 1" and Dr. Benjamín Colucci gave me an orientation about the topic. This project taught me how to identify a civil

engineering problem and find efficient and economical solutions. In a project for the course "Surveying 1", my partners and I conducted experiments in the field and created a measure plane with the data we obtained. This project taught me how to interpret and use physically obtained data. More importantly, I learned how to collaborate with team members. In a project entitled "Design of Oscillating Link Mechanism", I helped to design a motorized mechanism that moved a bar through a given degree of rotation in a restricted time frame. I used mathematical concepts to develop this design. From this project, I learned to pay attention to small details and I developed the skills necessary to work with a precise system.

In addition to these civil engineering projects, I have conducted research projects in the fields of Biomaterial and Biofluids. In the biomaterial project, my partners and I researched information about biomaterials used in artificial heart valves. In the biofluids project, we researched and wrote articles on arthritis and body pain. In both projects, I learned to write scientific articles and make power point presentations. Both of these projects gave me an appreciation for the interconnection of different engineering fields; I learned that civil engineering and bioengineering use the same equations and theories to govern the behavior of the major fluids and materials in each field. In others courses, I developed skills in computers programs such as Microsoft programs, Math lab, Fortran and Auto Cad.

I would like very much to participate in the Professional Development Program. I believe that the Alternative of Integrate Transport is a system that will help to alleviate the congestion and pollution level in San Juan and it is vitally important that we develop and implement it. The Professional Development Program is a great opportunity for undergraduate students to learn about Operation Processes and Integration of Transport Systems and to develop skills that will be required in many different fields. I am specifically interested in helping to create strategies for developing the areas around Tren Urbano without negatively affecting its stations. I think that if the surrounding areas are developed properly, more people will be encouraged to use public transportation and this will decrease the level of congestion in the metropolitan areas. My experiences in class projects have taught me to work well with team members, to pay attention to details, to conduct field experiments and to accurately interpret the data obtained through experiments. I hope to have the opportunity to participate in the Professional Development Program. I believe that I will make significant contribution to this project.