



# WPI

## Namibia Project Center (NPC)

### WPI & the Global Projects Program

Worcester Polytechnic Institute (WPI), founded in 1865, is a private technology-oriented university located in Worcester, Massachusetts, with approximately 4,700 undergraduate students. An undergraduate requirement at WPI is a third-year interdisciplinary project called the “Interactive Qualifying Project” or IQP. For over forty-years WPI has involved students in multidisciplinary project work around the globe at over forty project centers. These projects are typically completed in teams of 4 under the direction of 2 advisors on- and off-campus. A fourth-year undergraduate requirement is the academic major-specific capstone project, the “Major Qualifying Project” or MQP, that is sometimes completed off-campus.



### History of the NPC

The NPC was opened in 2003 in Windhoek and has been hosting student-implemented projects ever since. These projects typically focus on sustainable development, particularly related to key issues in Namibia, such as unemployment, water use, energy use, transportation, and education.

### Sponsoring Organizations

Our projects occur as partnerships with organizations we term as “sponsors”. A sponsor is an individual or organization that proposes a social and/or technical problem which would benefit from the work of a student team, and meets the educational needs of the students of WPI. Sponsoring organizations are not expected to provide funds for projects, unless it involves fieldwork outside of Windhoek. Most of these projects occur with universities, research centres, companies, NPOs, NGOs, and government agencies. Some key organizations we have currently work with or have worked with in the past include:

- The Namibia University of Science and Technology (NUST)
- Men on the Side of the Road (MSR)
- EduVentures
- The Walvis Bay Corridor Group (WBCG)
- TransNamib
- The Desert Research Foundation (DFRN)
- Namibia Housing Action Group (NHAG)
- The Cheetah Conservation Fund (CCF)

### Contact Information

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## Key Dates 2018

	<u>Summer-Fall Teams (a)</u>	<u>Winter-Spring Teams (b)</u>
Students being at WPI:	10 Jan	12 Mar
Students being in Windhoek:	12 Mar	18 Aug
Projects Completed:	5 May	13 Oct

**7 weeks**

**8 weeks**

(a) 10 Jan	Students define problem, complete background research, and develop written proposal	(a) 12 Mar	Full-time (40 hours/week/person) on-site project work with guidance of WPI faculty advisors and written	(a) 4 May
(b) 12 Mar		(b) 18 Aug		(b) 13 Oct

### What WPI Provides:

1. **A team** of carefully selected and prepared students who applied to the NPC through an application process, essay, and interview
2. **Over 1600 person-hours** of preparation and fulltime work in Namibia
3. **WPI Advisors:** 2 experienced WPI professors who reside in Namibia during the projects' duration to advise the students during all stages of the project

### What sponsor is asked to provide:

1. **A problem/ topic** for 3-4 students to take on with 7 weeks of preparation and research, and 8 weeks of fieldwork
2. **A place** for students to work, and access to any information, equipment, or facilities needed for the project, including a printer and internet access
3. **A project liaison**, 1 or 2 individuals from the organization who can commit to offering guidance, point the students towards information, and be available to answer questions
4. **Safe transportation and housing** on required field research trips is mandatory from sponsors, as well as an accompanying staff member





# WPI

## Examples of past Interactive Qualifying Projects in Namibia



# **A Recommended Recycling Processing System for the Informal Waste Collectors of Oshakati, Namibia**



## **Project Outcome:**

WPI students teamed up with the Namibia University of Science and Technology in order to research ways to increase the earnings of informal waste collectors (IWCs) in Oshakati, Namibia. Through extensive research, the team found that a small-scale, solar-powered plastics and aluminum shredding machine could be funded by the Oshakati Town Council to quadruple the monthly earnings of IWCs.

# **Flooding and Erosion Control in the Informal Settlements of Windhoek, Namibia**



**NHAG**  
NAMIBIA HOUSING  
ACTION GROUP

## **Project Outcome:**

WPI students sponsored by the Namibia Housing Action Group, increased the capacity of the Otjomuise community to solve problems that arise from frequent flooding and erosion during the rainy season. After researching the nature of rainwater problems, the team developed and implemented solutions alongside the community, which were then expanded upon after completion of the project.

# **Sustainable Paper Insulation for Kambashus in Informal Settlements of Namibia**



## **Project Outcome:**

WPI students collaborated with residents of Katutura and the Men on the Side of the Road Project to develop sustainable paper insulation to be implemented into metal shacks of Katutura. The team conducted testing on fire safety, materials, and production techniques to create a functional prototype.

Worcester Polytechnic Institute (WPI) is a private university founded in 1865, with a focus on science and technology. Located in Worcester, Massachusetts, WPI has approximately 4,700 undergraduate students and 1000 graduate students. All WPI third-year undergraduates must complete an interdisciplinary research project called the “Interactive Qualifying Project,” or IQP. Students complete their IQP in teams to address issues of humanity, and to understand how culture and social structures will need to be considered, even in technology-related careers. WPI students have assisted in project work in areas all around the world in over 30 project centers.

In order to complete an Interactive Qualifying Project, WPI students need collaborative organizations. These collaborators, called “sponsors” typically include community groups, government agencies, and other non-profit organizations. Sponsors identify a topic, problem, or need for students to investigate in order to improve their organization or to work towards the organization’s mission. Sponsoring organizations do not need to fund WPI students, rather the WPI Namibia Project Center will allocate small project budgets, and students pay for their own travel and accommodation. Past Namibia sponsoring organizations include The Cheetah Conservation Fund, The Desert Research Foundation, Men on the Side of the Road, and The Namibia University of Science and Technology.



# WPI

Examples of  
past abroad  
Major  
Qualifying  
Projects





# **Improving the Sustainability and Accessibility of the La Marta Wildlife Refuge**



**Location: San Jose, Costa Rica**

## **Project Outcome:**

WPI students designed sustainable trails for the La Marta Wildlife Refuge and a transport system that would allow mobility impaired persons to cross the Gato River. The trails were designed after extensive soil erosion and runoff analyses, and the transport system was designed after a safety analysis and a material component selection.

# Designing a Robotic Arm for Moving and Sorting Scraps at Pacific Can, Beijing, China



**Location: Beijing, China**

## **Project Outcome:**

This Major Qualifying Project focused on the potential for a robotic arm to be used to assist Pacific Can Company Ltd. with their recycling process. The arm would be used to move and stack blocks of scrap metal, and would increase overall efficiency of production. The MQP team researched work area design, alarm systemization, and tool selection.

# Designing a Biomimetic Prosthetic Flipper for a Kemp's Ridley Sea Turtle



**Location: Key West  
Florida**

## **Project Outcome:**

WPI students developed a first generation prosthesis to assist a Kemp Ridley sea turtle that had an amputated flipper. A second team also created a lightweight attachment to properly align the residual limb. The final product attaches securely and allows the sea turtle to swim effectively.

Worcester Polytechnic Institute (WPI) is a private university founded in 1865, with a focus on science and technology. Located in Worcester, Massachusetts, WPI has approximately 4,700 undergraduate students and 1000 graduate students.

#### All WPI

final-year undergraduates must complete a thesis project within their field of study called the “Major Qualifying Project,” or MQP. Students may work individually or on a team, and can work on projects that were designed by their advisor, or they can propose a project idea themselves. The MQP consists of professional-level design and research, and is used to demonstrate a student’s knowledgebase in their field of study. The MQP allows students to solve real life issues often for outside sponsoring organizations.

Common WPI areas of study:

- Civil Engineering
- Environmental Engineering
- Mechanical Engineering
- Biomedical Engineering
- Computer Science

and many other areas related to mathematics, science, engineering, and technology.

## **THE WPI NAMIBIA PROJECT CENTER (NPC): A GUIDE FOR PROJECT SPONSORS**

Since 2003, Worcester Polytechnic Institute (WPI), a US-based technological university, has been sending mixed teams of undergraduate students to Namibia to complete 8-week interdisciplinary projects. These projects connect science or technology to social issues and human needs and have been sponsored by Namibian NGOs, companies, research centres, and government agencies. The students are accompanied by WPI professors who serve as residential project advisors and work closely with the student teams and the project sponsors. Students and advisors are affiliated with the Namibia University of Science and Technology (NUST), which serves as a host institution. The students pay for their own travel and housing expenses and receive no fee. Details of the program are provided below.

For more information, please contact the WPI Program Director, Prof. Creighton Peet (cpeet@wpi.edu; tel. +508 831 6730). Further information can also be obtained from our NUST staff person who serves as our Project Coordinator in Namibia: Yatva Hinda; tel: 061-207-2709; email: yhinda@nust.na

### **AN OVERVIEW OF WPI AND ITS STUDENT PROJECT PROGRAMS**

Founded in 1865, WPI is a private technology-oriented university, located in Worcester, Massachusetts, about 65 km west of Boston, with approximately 4,700 undergraduate students, 2,000 graduate students, and over 350 full time faculty. WPI was recently named by the Association of American Colleges and Universities as one of 16 "Leadership Institutions" for excellence and innovation in undergraduate education. WPI students pursue ABET accredited degree programs (BS, MS, and PhD) in engineering, the sciences, or management.

As part of their BS degree requirements, all WPI undergraduates must complete three significant projects, including a third-year interdisciplinary project called the "Interactive Qualifying Project", or IQP. The IQP is not directly related to the students' major areas of study. Instead, by working on multidisciplinary teams to address problems related to technology, society, and human needs, students come to understand how their careers in technology will impact, and be affected by, societal structures and cultural values. The students are asked to develop specific goals, conduct research, gather relevant information, and provide a useful result to the project sponsor. Students complete IQPs in teams of 3 to 4 under close direction of WPI advisors, both on and off-campus.

The IQP is an academic degree requirement equivalent in credit to three courses, and is often done off-campus in collaboration with public, private, or nonprofit agencies or organizations. The students cannot receive payment, but direct project expenses, as mentioned below, are requested of the sponsor. WPI has created 40+ "Project Centers" in locations around the world, including programs in Europe, Central America, North America, Africa, and the Asia-Pacific region. Typically, about 24 students and 2 WPI advisors will spend two months at these centers while the students work full time on projects in small teams.

Undergraduates are also required to complete the “Major Qualifying Project”, or MQP. This project is a culminating capstone project in the student’s academic major field. These projects can also be completed off-campus, and the number of off-campus MQPs is steadily increasing at WPI.

## **STUDENT PROJECTS AT THE NAMIBIA PROJECT CENTER**

WPI has been conducting student-implemented projects in Namibia since 2003. Most of them have been sponsored through government agencies, research centres, companies and NGOs. Our principal academic partner has been the NUST. Sponsors have included government affiliated agencies, such as the Ministry of Fisheries & Marine Resources (Aquaculture Division), Namibia Tourism Board, the City of Windhoek Departments of Economic Development, Tourism and Recreation, and Infrastructure, Water and Technical Services, the National Museum and the Municipality of Okahandja. Research Centres with which we have worked include The Desert Research Foundation of Namibia (DRFN) and GOABEB Habitat Research & Training Centre. NGOs with which we have worked include Men on the Side of the Road (MSR), EduVentures, Healthworks, formerly the Namibia Business Coalition on AIDS (NABCOA), Namibia Housing Action Group (NHAG) and the Cheetah Conservation Fund (CCF). Other organizations we have worked with are the Walvis Bay Corridor Group (WBCG and Trans-Namib. (See additional brochures for more information)

## **SPONSORING A PROJECT**

**Sponsors are individuals or organizations that propose a social/technical problem which would benefit from the work of a student team, and that also satisfies the educational needs of the students and of WPI.** Potential sponsors should contact the Project Coordinator at NUST or communicate directly with the Project Center Director to discuss the suitability of the proposed project. Once a project has been found to be appropriate, the sponsor should provide a written description of what the sponsor expects the students to achieve and what facilities the sponsor can provide to the NUST coordinator or to the Director by email. Experience has shown that the more detailed this description is, the more satisfactory the outcome will be for everyone. Where possible, the description should indicate what types of information the students need to have in order to complete the task successfully. See the calendar below for due dates.(6-7 project teams) and 2 resident advisors are involved each year.

**Key**



Winter-Spring team's preparation period at WPI  
Winter-Spring teams in Namibia

Project descriptions due to Center Director by February 14th



Summer-Fall team's preparation period at WPI  
Summer-Fall teams in Namibia

Project descriptions due to Center Director by November 30th

## 2018



## 2019



## **WHAT WPI PROVIDES:**

**1. A team of carefully selected and prepared students.** The students apply to the Namibia Project Center by submitting an application, writing an essay, and participating in an interview. They are selected based on previous academic performance, ability to work in teams, relevant background, motivation, independence and adaptability. The teams comprise 3 or 4 third-year students who are studying engineering, science, and management.

During the two months prior to arrival in Namibia (January to early March or mid-March to early May) the student teams develop specific goals for the project, conduct background research, determine appropriate methods, and prepare a formal written proposal which is sent to the project sponsor before they arrive. During this preparation period it is very important that the liaison is occasionally available to respond to inquiries from the students via telephone or e-mail.

In addition to the preparation work, the students work full time for 8 weeks in Namibia, for a total of over 1600 person-hours of effort for the sponsor from a 4-student team. WPI will arrange for the students' housing in Windhoek, as well as help arrange for their travel to Namibia. The students also have their own university provided health insurance coverage.

**2. WPI advisors.** Two experienced WPI professors will be in residence in Namibia for the duration of the projects, serving as advisors to the students, and will work with the sponsors to help guide the students' work.

**3. Results and Documentation.** The students will provide the sponsor with:

- Whatever recommendations, documents or other products that are appropriate to the project
- An extensive, formal project report detailing the project process and results; and
- A formal oral presentation in which they will describe their results to the sponsor and other interested parties

The WPI advisors will work with the students to ensure that the results and documentation are useful to the sponsor.

## **WHAT THE PROJECT SPONSOR IS ASKED TO PROVIDE:**

**1. A problem of suitable scope** for 3-4 students to undertake in 8 weeks time. This problem should be determined in advance (by November 30th of the preceding year for summer-fall projects or February 14th of the same year for winter-spring projects) so that the students can develop specific goals and a project proposal in the January-February and March-May time frame.

**2. A place for the students to work**, and access to any information, equipment, or facilities needed for the project, including computer, printer, and internet access.

**3. Involvement from 1-2 individuals at the organization** who can serve as the project liaison and help provide guidance, answer questions, and point the students toward resources and information. The liaison



should be able to communicate with the students before they arrive, and then be available to meet with them and their advisors on a regular basis once they are in Namibia. Liaisons typically report a weekly time commitment of 2-4 hours. If fieldwork is required, the liaison or another reliable and trained staff member must accompany the students at all times.

**4. Support, where possible, with direct project-related expenses**, such as student travel related costs within Namibia, or any necessary materials and supplies. Since the students are working for academic credit, they are not employees and are not paid by the project sponsor. Students pay for their own airfare, housing, and meals while in Windhoek, but if they must stay outside of Windhoek for field work, we expect the sponsor will cover lodging and transportation costs.