IPRO 331

Global Warming & Community Outreach
Final Report

Dr. Peter Lykos (Faculty Advisor)
Carol DeBiak (Science & Engineering Librarian)
Lidia Calcaterra (Faculty Advisor)
# Table of Contents

Executive Summary.............................................................................................................3-4

Purpose and Objectives....................................................................................................5-7

Organization and Approach..............................................................................................8-9

Analysis and Findings.......................................................................................................10-11

Conclusions and Recommendations................................................................................12-13

Appendix..........................................................................................................................14-19

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Budget</td>
<td>15</td>
</tr>
<tr>
<td>A2. Team Members</td>
<td>15</td>
</tr>
<tr>
<td>A3. Free Times</td>
<td>15</td>
</tr>
<tr>
<td>A4. Contact List</td>
<td>16</td>
</tr>
<tr>
<td>A5. Inside Brochure</td>
<td>17</td>
</tr>
<tr>
<td>A6. Brochure Outside</td>
<td>18</td>
</tr>
<tr>
<td>A7. Research Subgroups</td>
<td>19</td>
</tr>
</tbody>
</table>
Executive Summary

The main goal of IPRO 331 is to create awareness in the community about global warming. The issue of global warming was not really paid any attention until the late 1980s and early 1990s although there were papers published in the 1930s. Even now some people have only heard of the idea of global warming, but don’t even have a grasp of the science behind it. We want to raise awareness because it is a very important issue to understand. We set aside some goal at the beginning of the semester which we felt were important. Some of them included reaching a larger and more diverse audience, developing public speaking skills, providing an objective view and giving the presentation in a way so as to engage the audience. The goal of providing an objective view for the topic was also an ethical issue we faced among others.

The Intergovernmental Panel on Climate Change (IPCC) was created in 1988 to assess scientific information that deals with human caused climate change, the impact of this human caused climate change, and options for adaptation and mitigation. The presentation already included the first working group of the IPCC which is the physical science basis. At the beginning of the semester we wanted to have an updated presentation that involved the third working group of the IPCC which is mitigation of climate change. For this semester we worked on updating the presentation to include the third working group of the IPCC which is the mitigation of climate change. During and after the update to the presentation the main focus was scheduling as many presentations as possible. The scheduling was helped by the creation of a brochure and website which outlined the main points of the presentation.
The team was able to update last semester’s presentation by adding a new sup-topic, Climate Engineering to the presentation, and by revising the slides. The team was also able to reach out to a more diverse audience.

The team encourages next semester’s IPRO to reach out to even more people, and to be prepared to start scheduling presentations sooner. The team has created a contact list to make it easier for next semester’s team to schedule.
Purpose and Objectives

Background

IPRO 331 is trying to raise awareness in the community about global warming. Our goal is not to persuade the audience, it is to present research conducted by scientists in order to educate people about global warming. We feel that not enough people know the basics of global warming and we are trying to remedy that. Some ethical issues that we encountered during the semester include providing objective views of the issues discussed, distributing the workload equally among group members, and organizing all of our materials from this semester so that next semester can begin more quickly.

In terms of being objective in our research we feel that we did a good job by just sticking to presenting scientific, factual information that is backed by the IPCC Assessment Report. We felt that this was our most reliable resource we had available. The workload distribution was mostly taken care of by volunteering. This system worked for us and every member provided significant contributions. The organization of materials could be handled by storing them on a flash drive or other portable media as everything is available digitally.

Research on global warming did not start until the early 1900’s. In 1938, Guy Stewart Callendar published a paper called *The Artificial Production of Carbon Dioxide and its Influence on Temperature* and noted significant positive trends in both carbon emissions and an increase in temperature over the first four decades of the 1900’s. He then made the connection between these trends and the combustion of fossil fuels. Callendar also described the high concentrations of carbon dioxide in the atmosphere as an enhanced greenhouse effect. His work would be criticized and downplayed until research in the 1990’s confirmed his early work.
The work of Calendar leads us to the Intergovernmental Panel on Climate Change (IPCC) which was formed in 1988. The IPCC released their first assessment report in 1990 which concluded that atmospheric concentrations of greenhouse gases were increased substantially by human activity. They also confidently stated that carbon dioxide has been responsible for over half of the enhanced greenhouse effect. Most recently, a report was released in 2007 which stated that sea level rise and anthropogenic warming would occur for centuries even if carbon emissions were to be stabilized. The consequences of global warming have already begun appearing.

Objectives

At the beginning of the semester we set aside objectives we wanted to have accomplished at the end of the semester. First we had to work on updating the previous semester’s PowerPoint presentation. This is because we wanted to have fairly recent information concerning global warming as well and the previous presentation did not have everything we wanted to include. Second, we wanted to expand our audience beyond just going to schools. By expanding our audience we can reach more people which is important. Third, we wanted to provide an objective view of global warming. We present the facts and let the audience decide for themselves. Fourth, after having a base presentation we wanted to look at different ways to deliver the message to make it more fun or intuitive for the audience. Some examples included having the presenters engage in dialogue or altering how in depth we go when we cover the material. First, we wanted to give surveys to the audience after the presentation so we could receive feedback as to how informative it was. Sixth, we wanted to update and improve the website from last semester so our audience has a place to go if they want to find out more. Finally, we wanted each team member
to have better public speaking skills. Public speaking is an important skill to develop because it is utilized in many different professions.
Organization and Approach

Throughout the semester when we had a task to complete we would break into groups if applicable to the problem. There were also tasks that were given to individuals that did not require a group effort. There were four topics in the presentation and each topic was assigned to two people. These team members did their own independent research on their topic and revamped the slides from the previous semester. The research involved obtaining up to date information regarding the assigned topic. For example, obtaining more recent information on U.S. energy sources to note how dependent we are on fossil fuels right now. When doing research we always look to the most recent IPCC Assessment Report. This report is based mainly on peer reviewed scientific articles. This also served as the basis for a lot of research done in the previous semester. Most of the new research conducted was for our new topic of climate engineering which is covered in working group three of the assessment report. This topic has only very recently become an area of interest. As people are beginning to see that the effects of global warming are real there has been more interest in this topic.

A. Scheduling Presentations and Brochure

While getting the final presentation in order, every group member was trying to schedule as many presentations as possible. We had some difficulties trying to arrange presentations with some schools because they already have a set schedule for the fall semester and it would be difficult to work us in so they wanted to bring us in during the spring. Some contacts were not very responsive through both e-mail and telephone. While contacting these places we had a brochure that we could send that served as a summary of our presentation. Also, after our website was up and running we could send the address to interested parties so they get a bigger glimpse into what our presentation is like. The website also included links to PowerPoint
presentations done in CHEM 410 that broke down the first working group of the IPCC Assessment Report. These presentations included voiceovers that summarized the entire 1000+ page document. Dr. Lykos provided our team with useful contact info of organizations that would be interested in our presentation. He also helped us get in contact with Gerald Doyle who provided us with materials to give to audience members that participated effectively during the presentations. Professor Calcaterra was also very helpful in both providing contact info and scheduling presentations. Carol DeBiak was also very helpful with our research.

B. Presentations Given

<table>
<thead>
<tr>
<th>Location</th>
<th>Presenters</th>
<th>Total Attendees(Approximately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1 Auditorium</td>
<td>Ryan &amp; Adarsh</td>
<td>8</td>
</tr>
<tr>
<td>Rice Campus</td>
<td>Shweta &amp; Daniel</td>
<td>50</td>
</tr>
<tr>
<td>Brookfield</td>
<td>Ryan &amp; Adarsh</td>
<td>9</td>
</tr>
<tr>
<td>Gage Park</td>
<td>All group members</td>
<td>210</td>
</tr>
<tr>
<td>De La Salle</td>
<td>Puneet, Shweta, Tanya and Sean</td>
<td>100</td>
</tr>
<tr>
<td>Lake Park</td>
<td>Sean and Tani</td>
<td>44</td>
</tr>
<tr>
<td>Ohio</td>
<td>Ryan</td>
<td>30</td>
</tr>
<tr>
<td>Andrew High School</td>
<td>Puneet, Adarsh</td>
<td>400</td>
</tr>
<tr>
<td>IMS</td>
<td>Sean, Jaime</td>
<td>7</td>
</tr>
<tr>
<td>Caitlyn Workman's House</td>
<td>Tanya</td>
<td>5</td>
</tr>
<tr>
<td>Maine South</td>
<td>Ryan and Sean</td>
<td>100</td>
</tr>
<tr>
<td>Arlington Heights Senior Center</td>
<td>Tanya</td>
<td>5</td>
</tr>
<tr>
<td>Lidia Calcaterra's House</td>
<td>Tanya and Sean</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 1: List of presentation locations and team members present

The table above is a summary of where we presented and which team members took part in that presentation. We tried to have the person who initially contacted the location to be at the presentation. Presenters were based on team member availability. In total we reached almost 1000 people during the semester. For the most part the audience reception was very positive and schools were very interested in bringing us back to give more presentations. This semester we did not hand out surveys to the audience as we felt feedback from teachers was more reliable as there were some joke responses that students wrote down as feedback last semester.
Analysis and Findings

A. Research Findings

The IPRO team has surely made an impact in the community. By presenting at various schools and organizations, the team was able to spread awareness about Global Warming. The four sub-topics included the consequences of Global Warming, fossil fuels, alternative energy, and climate engineering. The first step in solving the ongoing problem of Global Warming is spreading awareness, and the team has accomplished that. At the end of the presentations, the team also gave simple ideas of how they themselves can save energy. The team also encouraged the audience to start giving presentations themselves; they can present in numerous places, including their church, family events, or schools.

B. Major Accomplishments

The team had major improvements in the presentation. The team added in a new subtopic, climate engineering. Climate engineering is research to manipulate the climate, that will be able to reduce Greenhouse Gases or lower the earth’s temperature. We also discussed several possible climate engineering ideas that are currently being worked on. The presentation was also updated by having simple ideas of how people can save energy every day. For example, people should unplug electronics when not in use.

The professor, Dr. Lykos, emphasized that presenting skills is a very important tool to have. For example, the professor held an in-class activity to improve the quality of our voice. Each member had to recite the alphabet, and the purpose was to listen to the loudness and the enunciation of the presenter’s voice. The saying, practice makes perfect, also applied to the team. As the semester went on, the team members gained more experience in giving presentations. The
The team became better and better with each presentation. Presenting in different areas and settings was also particularly helpful.

The team also influenced their wide range of audience. The team was able to do a booth style presentation at the Arlington Heights Senior Center. The team has also set up a formal presentation at the Senior Center in January. The team was also able to do an out of state presentation in Ohio. At the end of the presentations, the audience members seemed genuinely more interested in the subject. This was evident because of their questions and facial expressions.
Conclusions and Recommendations

A. Conclusions

The main objective of this IPRO is to build on the previous semester’s presentation in order to educate the audience about the cause, impact, and responses to global warming, and to give presentations to the community on global warming. The IPRO accomplished this goal, with a total of 14 different locations for presentations, and reaching an audience of over 1,000 people. The team also added a new sub-topic, climate engineering to the presentation. They also revised and edited the presentation from last semester.

We would like to thank our Faculty advisor, Professor Peter Lykos, for his devotion to the mission of this IPRO: to spread knowledge about global warming and its research to many individuals throughout the community. We would also like to thank Carol DeBiak and Lidia Calcaterra for their support and helpful advice during this semester.

B. Recommendations

Next semester’s IPRO should try to diversify their audience, by reaching to different ages and people. It would be great to start presenting at elementary and middle school age children because children are the future of this planet. The next IPRO should try to create a voice-over PowerPoint to reach out to more communities and actually make this a global outreach, where the group is able to send out the presentations and not be there physically yet still have an impact on the issue of global warming. Also the next IPRO should start the outreach right away to minimize schedule conflicts and to maximize the potential for the short semester.
Also start learning and studying the presentation slides as soon as possible. Everyone should know every slide so that presentation schedules can be put together that work around future team members’ schedules.
Appendix

A1. Budget

A. Transportation
   a. Requested $200
   b. Received $200
   c. Used $22.16
      • This was mostly used to recoup the cost of gas to travel to presentations

B. Printing
   a. Requested $200
   b. Received $200
   c. Used $40.32
      • This part of the budget would take care of the printing costs of brochures and surveys to be handed out at presentations

C. Snacks/Misc.
   a. Requested $100
   b. Received $100
   c. Used $47.71
      • There was a pizza party at the beginning to get to know each other

D. Total*
   a. Requested $500
   b. Received $500
   c. Used $110.19

*Total amount is not yet final
A2. Team Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Major</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shweta Ghandi</td>
<td>3rd Year UG</td>
<td>Molecular Biochem</td>
<td>Minute Taker</td>
</tr>
<tr>
<td>Daniel Kim</td>
<td>3rd Year UG</td>
<td>Chemical Engineer</td>
<td>Printing</td>
</tr>
<tr>
<td>Ryan Mcclure</td>
<td>3rd Year UG</td>
<td>Chemistry</td>
<td>Team Leader</td>
</tr>
<tr>
<td>Sean Murray</td>
<td>5th Year UG</td>
<td>Architecture</td>
<td>Website Design</td>
</tr>
<tr>
<td>Tanya Prabhakar</td>
<td>3rd Year UG</td>
<td>Psychology</td>
<td>Schedule Compiler</td>
</tr>
<tr>
<td>Puneet Ralhan</td>
<td>3rd Year UG</td>
<td>Biochemistry</td>
<td>Project Plan</td>
</tr>
<tr>
<td>Jaime Sahagun</td>
<td>3rd Year UG</td>
<td>Computer Science</td>
<td>Treasurer</td>
</tr>
<tr>
<td>Adarsh Shukla</td>
<td>4th Year UG</td>
<td>Biochemistry</td>
<td>Team Leader</td>
</tr>
</tbody>
</table>

A3. Free Times

<table>
<thead>
<tr>
<th>Name</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adarsh</td>
<td>1:00-5:00 p.m.</td>
<td>Morning - 1:00 p.m.</td>
<td>none</td>
<td>4:30 p.m. - onwards</td>
<td>All day</td>
<td>All day</td>
<td>All day</td>
</tr>
<tr>
<td>Puneet</td>
<td>3:15 p.m. - onwards</td>
<td>8:00 a.m.- 3:15 p.m.</td>
<td>3:15 p.m. - onwards</td>
<td>8:00 a.m.- 3:15 p.m.</td>
<td>8:00 a.m. - 1:00 p.m.</td>
<td>4:00 p.m. onwards</td>
<td></td>
</tr>
<tr>
<td>Tani</td>
<td>8-11 a.m. 6:30 p.m.- onwards</td>
<td>1-3:15 p.m.</td>
<td>8-11 a.m. 7:30 p.m.- onwards</td>
<td>1-3:15 p.m.</td>
<td>5:30 p.m.- onwards</td>
<td>All day</td>
<td>2 p.m.- onwards</td>
</tr>
<tr>
<td>Sean</td>
<td>5 a.m.-1 p.m. 6 p.m.-12 p.m.</td>
<td>5 a.m.- 11 a.m. 4 p.m.-12 p.m.</td>
<td>5 a.m. -1 p.m. 6 p.m. - 12:00 p.m.</td>
<td>5 a.m. -1 p.m. 4 p.m. -12:00 p.m.</td>
<td>5 a.m. -1 p.m. 6 p.m. -12:00 p.m.</td>
<td>All day</td>
<td>All day</td>
</tr>
<tr>
<td>Daniel</td>
<td>Morning-11:25 a.m. 3:05 p.m.- Onwards</td>
<td>Morning- 10 a.m. 12:40- 3:15 p.m. 6:15 p.m.- Night</td>
<td>Morning-11:25 a.m. 3:05 p.m.- Onwards</td>
<td>Morning-11 a.m. 12:40- 3:15 p.m. 6:15 p.m.- Night</td>
<td>All Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shweta</td>
<td>4:30 p.m. - onwards</td>
<td>4:30 p.m. - onwards</td>
<td>4:30 p.m. - onwards</td>
<td>4:30 p.m. - onwards</td>
<td>Morning - 11:15 p.m. 1:00 p.m.- onwards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaime</td>
<td>12:40 p.m. - onwards</td>
<td>1 - 3 p.m.</td>
<td>12:40 p.m. - onwards</td>
<td>1 - 3 p.m.</td>
<td>Morning - 4 p.m.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ryan</td>
<td>9 - 11 a.m. 5 - onwards</td>
<td>11:30 - 1:30 p.m. 4:45p.m. - onwards</td>
<td>9 - 11 a.m. 5 - onwards</td>
<td>11:30 - 1:30 p.m. 4:45p.m. - onwards</td>
<td>All day</td>
<td>All day</td>
<td>All day</td>
</tr>
</tbody>
</table>
A4. Contact List

Contacts:

- Linkin Park High School
- Holy Trinity
- Kenwood Academy High School
- Oakbrook Rotarian
- Hanes Elementary
- NCHS
- NVHS
- Von Steuban
- Michele Clark Magnet High School
- Rotarians
- Sierra Club
- De La Salle
- Carl Sandburg High School
- Whitney Young
- Camras Scholars IIT
- IDCC
- Lake Park High School
- Wheaton North
- Schaumburg High School
- Conant High School
- Jones College Prep
- Near South Rotarians
- Downers Grove North
- Downers Grove South
- Lakota East
- Curie
- North Side Prep
- Maria High School
A5. Outside of the Brochure

Who are we?
We are a team of undergraduate students from the Illinois Institute of Technology. We come from different backgrounds and majors, providing different views and ideas. The Interprofessional Project Program is a way for students to learn as a team while transforming to solve a real-world problem. Students are also able to learn project management skills and communication skills.

Our Purpose
We intend to spread the facts about global warming to raise awareness as the issue becomes increasingly more important.

How can you contact us?
If you would like to learn more about our presentation or schedule a presentation at your site, please contact us at:
globalwarming@iit.edu

Illinois Institute of Technology
3300 South Federal Street
Chicago, IL 60616
Email: globalwarming@iit.edu
Website: http://www.iit.edu/ipro331
**What Is Global Warming**

The average surface temperature of the earth has increased more than 1 degree Fahrenheit since 1800, and the rate of warming has been nearly three times the century-long average since 1970. Experts agree that human activities—mainly the release of Greenhouse gases—such as carbon dioxide and methane—from smokestacks, tailpipes, and burning forests, are probably the dominant force driving the trend.

**Effects of Global Warming**

The consequences of global warming are the destruction of the Earth's snow and ice cover, which would increase the global absorption of solar radiation. This will significantly melt the land ice and raise sea levels. Average temperature in the Arctic is rising twice as fast as elsewhere in the world. In Alaska, temperatures have increased an average 3.0 degrees Celsius between 1970 and 2000. This increase in temperature poses a threat to the ecosystems in the polar regions. Species such as the polar bear are facing endangerment because the ice is melting their habitat. The Gulf Stream that bathes Britain and northern Europe in warm waters from the tropics has weakened dramatically in recent years. A consequence of global warming that could trigger more severe winters and cooler summers across the region, scientists warn today.

**Fossil Fuels and CO₂**

Fossil fuels (oil, gas, and coal) are the main source of energy used today. They are burned to provide significant amounts of energy, but as a byproduct of combustion CO₂, water, and other gases are released. These gases are referred to as Greenhouse gases and are a major contributor to Global Warming and a major factor in pollution. The Greenhouse gases trap radiation and prevent it from leaving the atmosphere—this is known as the Greenhouse Effect. The main greenhouse gases are water vapor, carbon dioxide, methane, nitrous oxide, and fluorocarbons.

**Alternative Energy**

There are many alternative fuels which can be used to obtain energy. Using crops high in cellulose, sugar or vegetable oil can form biofuels which create less CO₂ and get better gas mileage. Nuclear fusion is a resource that can be utilized to obtain emission-free energy. Nuclear fusion entails the act of splitting atoms to release large amounts of energy. While nuclear energy is a great resource, its main pitfall is the disposal of radioactive waste. Both wind and solar energy function without fuel. Wind energy is also emissions-free and government incentives are available to use. Solar energy converts radiant energy from the Sun (the main source of energy for our planet) into usable energy.

**Climate Engineering**

Climate engineering involves proposals to deliberately manipulate the Earth's climate to counteract the effect of Global Warming from Greenhouse Gas emissions. Proposals of this sort include ideas such as carbon dioxide capture from the atmosphere, space-based solar power, and land use management. Climate engineering is the cutting edge of climate research and development and is still in very early stages. It will take many years for any of these proposals to get implemented but they will be the subject of massive research in coming years. While such approaches could be effective, it is very important to note that the potential of climate engineering should not divert efforts from reducing carbon emissions overall.

**You Can Help!**

Below is a short list of things you can do to help reduce energy use and reduce the emission of Greenhouse Gases:

- **Turn down the thermostat.**
- **Purchase Energy Star labeled items when possible.**
- **Replace bulbs with Compact Fluorescent Bulbs.**
- **Turn off the lights in an empty room.**
- **Wash clothes in cold water.**
- **Improve the insulation in your home.**

If you would like to learn more ways you can help or are just interested in learning more about Global Warming, visit our website at:

[http://www.iit.edu/~ipro331x99/](http://www.iit.edu/~ipro331x99/)
A7. Research Subgroups

Organization of the Team

- Shweta Gandhi
- Tanya Prabhar
- Ryan McClure
- Adarsh Shukla
- Daniel Kim
- Jaime Sahagun
- Sean Murray
- Puneet Ralhan

- Biofuels and Renewable Energy
- Climate Engineering
- CO₂ and Fossil Fuels
- Consequences