Abstract. Currently in its 7th year (2011) Hawaii’s annual Journey through the Universe (JtU) program is a flagship Gemini Observatory public education/outreach initiative involving a broad cross-section of the local Hawai‘i Island astronomical community, the public, educators, businesses, local government officials, and thousands of local students. This paper describes the program, its history, planning, implementation, as well as the program’s objectives and philosophy. The success of this program is documented here, as measured by continuous and expanding engagement of educators, the community, and the public, along with formal evaluation feedback and selected informal verbal testimony. The program’s success also serves as justification for the planned adaptation of a version of the program in Chile in 2011 (adapted for Chilean educational and cultural differences). Finally, lessons learned are shared which have refined the program for Gemini’s host communities but can also apply to any institution wishing to initiate a similar program.

1. Introduction

The Journey through the Universe program as managed and implemented by the Gemini Observatory\textsuperscript{1,2} is modeled after the national Journey through the Universe program.\textsuperscript{1,2}
through the Universe (JttU) program founded in 1999 by National Center for Earth and Space Science Education (NCESSE\(^3\)). The program, now entering its 8\(^{th}\) year (2011) on the Big Island of Hawai‘i, has experienced sustained (and sustainable) growth during its tenure in Hawai‘i and has matured into a well-established and well-recognized (locally and nationally) educational program\(^4\). The program’s key elements include:

- Astronomy and observatory staff educators/presenters who share their work and career passions in local classrooms (average of 5000+ participating students at over 300 classrooms per year);
- Teacher and master teacher workshops based on educational modules\(^5\) that are aligned with state and national education standards (four modules with average of 100+ teachers participating in workshops each year);
- Parent, student, and public science events (average of 1,730 participants/year);
- Community business/education partnership opportunities providing volunteer assistance (~24 “Ambassadors” per year help observatory staff educators/presenters). 29 local business partners (2011, see Table 1) provide additional resources i.e. t-shirts, food, prizes etc.);
- Guest lecturers and educators from institutions beyond Hawai‘i (NASA, NSF, Lunar Science Institute, etc.) who participate in many events and activities in order to broaden exposure and diversity for the experience of local students and the public.

All of these elements are combined to create an educationally focused, event/fun-filled week during the annual “Journey Week” – an expanded 10-day “week” that is the core of the JttU program\(^6\). During the past seven years this program has evolved based on evaluations, feedback and other informal input and continues to grow in new directions as described herein.

2. History

The JttU program originally took root under the leadership of Jeff Goldstein of the National Center for Earth and Space Science Education (NCESSE) as a national network of communities sharing a common goal of bringing science, technology, engineering and mathematics (STEM) researchers into local classrooms to share their passion for scientific exploration. The original JttU program began in 1999 and ran under NCESSE until 2006. During this period its reach grew into 13 communities across

\(^3\)http://ncesse.org/  
\(^4\)http://www.gemini.edu/images/pio/jttu/NSTA_article.pdf  
\(^5\)http://journeythroughtheuniverse.org/program_overview/program_overview_po_co.html  
\(^6\)http://www.gemini.edu/journey

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TABLE 1. All community partners participating in JttU in the 2011 implementation of the program.

<table>
<thead>
<tr>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank of Hawai‘i</td>
</tr>
<tr>
<td>Big Island Toyota</td>
</tr>
<tr>
<td>Business – Education Partnership</td>
</tr>
<tr>
<td>Caltech Submillimeter Observatory</td>
</tr>
<tr>
<td>Canada-France-Hawai‘i Telescope</td>
</tr>
<tr>
<td>Ctr for Astronomy &amp; Physics Ed. Research</td>
</tr>
<tr>
<td>DOE Hilo/Laupahoehoe/Waiakea Complex</td>
</tr>
<tr>
<td>Gemini Observatory</td>
</tr>
<tr>
<td>Hawai‘i Island Chamber of Commerce</td>
</tr>
<tr>
<td>Hawai‘i Island Economic Development Board</td>
</tr>
<tr>
<td>Hawai‘i Tribune-Herald</td>
</tr>
<tr>
<td>‘Imiloa Astronomy Education Center</td>
</tr>
<tr>
<td>James Clerk Maxwell Telescope</td>
</tr>
<tr>
<td>Japanese Chamber of Commerce &amp; Industry</td>
</tr>
<tr>
<td>Joint Astronomy Centre</td>
</tr>
<tr>
<td>KTA Superstores</td>
</tr>
<tr>
<td>KWXX</td>
</tr>
<tr>
<td>Mauna Kea Observatories Outreach Committee</td>
</tr>
<tr>
<td>NASA Infrared Telescope Facility</td>
</tr>
<tr>
<td>NASA Lunar Science Institute</td>
</tr>
<tr>
<td>National Radio Astronomy Observatory</td>
</tr>
<tr>
<td>Rotary Club of Hilo Bay</td>
</tr>
<tr>
<td>Smithsonian Submillimeter Array</td>
</tr>
<tr>
<td>Subaru Telescope</td>
</tr>
<tr>
<td>Thirty Meter Telescope</td>
</tr>
<tr>
<td>United Kingdom Infrared Telescope</td>
</tr>
<tr>
<td>University of Hawai‘i at Hilo</td>
</tr>
<tr>
<td>UH Hoku Ke’a and 2.2 Meter Telescopes</td>
</tr>
<tr>
<td>UH Institute for Astronomy</td>
</tr>
</tbody>
</table>

the US\(^7\). Only a small fraction of this original network of communities is still active in the program since core funding of the program was discontinued in 2005. After 2005 participating communities were left to pursue continuation of the program on a self-funded, ad-hoc basis.

Gemini Observatory joined the JttU network in 2004 and, in part due to the significant outreach and educational resources available at Gemini as well as the significant community of observatories on Mauna Kea at large, provided a model community for the effective integration of this program.

\(^7\)http://journeythroughtheuniverse.org/lc-network/lcn-network.html
The combination of a well-coordinated community of observatories with common outreach objectives, and a local department of education anxious to explore new and innovative ways to establish partnerships that would impact students, provided a formula and environment for sustained success that would outlive the original JttU program at NCESSE. The legacy of the original JttU program continues to thrive on Hawai‘i Island and is, and will continue to be, implemented in a manner that attracts and affects learners of all ages and engages observatory researchers and staff in ways that are fun, educational, and inspirational for everyone involved.

In summarizing the history of this program, it would be unfair to not recognize the similarities (and differences) between the JttU program and Project Astro which continues (2011) under the management and oversight of the Astronomical Society of the Pacific. While the two programs established themselves during similar timeframes, Project Astro is based on a commitment for scientists to visit classrooms four times in a given year whereas JttU is based on a high-impact week of programming and classroom visits that engages the entire community and relies on the relationship established between researchers and teachers to foster and facilitate future follow-up visits. Finally, because the JttU program meets so many of the criteria and goals of a Project Astro site, the Hawai‘i JttU program is considered an “adjunct” Project Astro site and JttU staff participate fully in the annual Project Astro site-leaders workshops.

Due to the successful history of JttU in Hawai‘i, the program is expected to continue and grow in new and innovative directions that will keep the program fresh and relevant for the future. Many of these visions are discussed in Section 10 of this paper.

3. Programmatic Objectives

The JttU program as currently implemented in Hawai‘i has three primary institutional objectives for the Gemini Observatory – these are to:

- Connect and engage learners with educators, scientists and engineers in an effective, lasting, and relevant manner;
- Engage the local community at all levels; and
- Foster an environment where students can pursue STEM careers and find local support and role models for their advancement.

8http://www.mkooc.org/
9http://www.astrosociety.org/education/astro/project_astro.html
10http://www.astrosociety.org/
11http://www.astrosociety.org/education/astro/about/involved.html
Likewise, the local Department of Education (North Hilo/Laupahoehoe/Waiakea Complex\textsuperscript{12}) has additional stated objectives for the program, which are to:

− Heighten awareness of science in classrooms;
− Help students meet the Hawai‘i Content and Performance Standards and national standards;
− Provide rigor, relevance and relationships in curriculum, instruction and assessment;
− Tap into the rich resources that are available in the Hilo community;
− Improve teaching staff in content fields. Provide professional development, in-service training sessions, networking and articulation amongst educators, scientists, and community members who can help improve teaching;
− Educate parents and the community in the space science enterprise.

4. Putting It All Together

The JttU program is remarkably multi-faceted. Often, when individuals unfamiliar with the myriad elements that make up the JttU program are exposed to all of its components they respond that they had no idea how much was involved, and how many elements need to come together to make the program work. The following discussion summarizes the program while offering a brief overview and sampling of each element that makes up the Gestalt of JttU.

The core of JttU is the annual Journey Week (JW), JW consists of an extended week (typically 10 days) during which the entire local community is engaged and students, teachers and the public are offered opportunities to learn directly from researchers and observatory staff in an environment that is fun and education-focused. At its most elemental level, a JW consists of master and classroom teacher workshops, presentations in classrooms (see Fig. 1), workshops for classroom presenters (generally observatory scientists/engineers), public science events (see Fig. 2), media programming, community and business appreciation events and opportunities for community members to participate and learn about the work of scientists, engineers and other staff who support and advance the science of astronomy in Hawai‘i.

Specifically, the following elements comprise the core of a JW:

\textbf{Astronomers, Engineers and Staff in Classrooms:} Astronomy educators are recruited from the observatories on Mauna Kea, University of Hawai‘i at Hilo, ‘Imiloa Astronomy Education Center\textsuperscript{13}, NASA and other observato-

\textsuperscript{12}http://165.248.6.166/data/complexarea.asp?key_complexarea=10
\textsuperscript{13}http://www.imiloahawaii.org/
Figure 1. Peter Michaud, Gemini Observatory, demonstrating carbon dioxide mirror cleaning during a classroom visit. (© Gemini Obs.)
ries from across the country and the world. Astronomers, scientists and engineers are often not equipped to visit classrooms and share their personal journeys which led them to their professional heights. The astronomer’s workshop, prior to JW, aids scientists and engineers in planning for classroom presentations and provides opportunities for dialogue with teachers regarding the most engaging discussions and activities for them to share with students (see Fig. 3).

**Teacher Workshops and Educational Modules:** The national JttU program produced (and still provides) “educational modules” that include lessons for both master teachers and all participating classroom teachers (see Fig. 4). Although the lessons meet the National Science Standards, the Hawai‘i JttU education team also aligned the modules with the Hawai‘i State Science Standards\(^\text{14}\). The Hawai‘i Department of Education (DOE) invested significant resources utilizing master science teachers to align all four modules that now are rotated on a four-year cycle designed to foster conceptual understanding through activities that seamlessly integrate content and process in order to facilitate engaging, inquiry-based learning.

\(^{14}\)http://standardstoolkit.k12.hi.us/index.html
Figure 3. Subaru Telescope’s Kumiko Usuda, Astronomer, demonstrates to the students the various wavelengths of light. (© Subaru Obs.)

Ambassadors: Ambassadors accompany the visiting scientists and engineers in classrooms, introducing them to the students and assisting with demonstrations and hands-on activities shared with students. The ambassador group is extensive and comes from highly diverse backgrounds including: physicians, former teachers, car dealership owners, bankers, and local university astronomy students to identify just a few.

Family Science Events: The local community embraces the annual science lecture/talks presented by distinguished astronomers and educators (see Fig. 5) as part of the JW. These public presentations are augmented by educational, hands-on activities and are attended by thousands of learners of all ages from our local community. In past years they have also fostered partnerships with the local mall, the University of Hawai’i at Hilo Theatre, downtown Hilo theatres and the ‘Imiloa Astronomy Center.

Chamber of Commerce Business Appreciation: The local Hawai’i Island Chamber of Commerce and Japanese Chamber of Commerce join together annually and sponsor a thank-you celebration for our scientist/engineer classroom presenters, DOE staff, ambassadors and businesses (see Fig. 6). This is the Chamber(s’) way of expressing their gratitude for making STEM
education exciting and engaging and inspiring our students. The community is deeply invested in the JttU program and our governor’s, mayor’s and state representatives’ offices attend the event or send representatives and produce proclamations of support\textsuperscript{15}.

\textbf{Community Support:} JttU has received financial support from many local businesses including the Bank of Hawai‘i, Thirty Meter Telescope, Hawai‘i Island Economic Development Board, Hilo Toyota, both the Hawai‘i Island and Japanese Chamber of Commerces, and the Business-Education Partnership to name just a few. In 2011 the NASA Lunar Science Institute\textsuperscript{16} offered monetary support and allowed their own educators and scientists to participate in classroom visits.

\textbf{Media Coverage/Promotions:} Local media, radio, and newspaper offer thousands of dollars worth of free advertising for JttU events and strongly promote the program’s message of science outreach to the community. Promotion of JW includes banners in our local airports and every participating school as well on main intersections going into the base facilities of the observatories. The schools place JttU information on their billboards and

\begin{footnotesize}
\begin{itemize}
\item[15] http://www.gemini.edu/journey
\item[16] http://lunarscience.nasa.gov/
\end{itemize}
\end{footnotesize}
Figure 5. Kevin Caruso creates a spacesuit for a young student during a Journey through the Universe Family Science day. (© Gemini Obs.)
websites in order to promote the scheduled scientists and engineers who will be visiting their schools.

5. Countdown to a Journey Through the Universe Week

All of these key elements converge during the annual JW and must be coordinated and planned well in advance, thus, a typical JW plan begins immediately after the previous year’s activities. The “timeline” that follows provides a context for planning and hints at the magnitude of the required effort:

JW MINUS 11 MONTHS:
As one JtU year ends, the next year is put in motion within the next 30 days. Based on the post-JW “issues” and “lessons learned” meetings, and evaluations submitted from the astronomers, teachers, principals, and ambassadors, the JtU team continues to make improvements and recommendations to improve the program. The Hawai‘i Department of Education and Gemini’s Public Information and Outreach staff meet to determine the 10 days during which JW will take place in the subsequent year. Venues are then booked for the workshops and family science events.

JW MINUS 9-10 MONTHS:
The Department of Education and Gemini Public Information Office contracts with lead educators who will conduct workshop for the astronomy educators, master teachers and general classroom teachers. Gemini’s PIO
office sends out thank-you letters with a JttU annual report attached. This annual report includes samples of materials produced, bios on the astronomy educators, highlights from the website, all media coverage including headline stories, brochures, newspaper and radio ads\(^\text{17}\).

A JttU website is established for the following year and it is updated regularly as details are solidified. Because this is a primary source of information for the public as well as JttU team-members, it is critical that this information is updated in a timely fashion.

**JW MINUS 7-8 MONTHS:**
JttU partners, including local businesses, are asked to provide monetary support for next year’s JttU program. Personal contact is required as they are investing resources and want to understand its impact. The funding must be in place early since commitments are required for venues, materials, contracted services, etc.

**JW MINUS 6 MONTHS:**
Recruitment of local, national, and international astronomy educators begins. Intent forms are sent out to all scientists that have participated in the program before or have expressed an interest in joining the JttU team. This form confirms days when participants are available for classroom presentations and which grades they would prefer (although requests are not guaranteed). The local Department of Education office begins interactions with their district’s schools and confirms which teachers and classes will be participating in the following year. It should be noted that this is not a trivial task since JttU engages an average of 19 schools and over 350 classrooms annually. It typically takes three months before final schedules are confirmed.

Presentations are provided for local Rotary Clubs, Chamber of Commerce and any business that is considering providing monetary support for the JttU program.

**JW MINUS 4-5 MONTHS:**
Local Chamber of Commerces meet with JttU team members to discuss plans for the annual appreciation event they will hold for the astronomy community, businesses, and Department of Education participants. The governor, mayor, senate and house offices are asked to send a formal proclamation and a representative to the event.

This timeframe is also when a significant “media blitz” begins. Radio stations are contacted and the quantity of free public service announcements is determined and recording studio facilities are secured to tape the “spots.” The local newspaper’s editor is also contacted and a commitment is agreed

\(^{17}\)http://www.gemini.edu/images/pio/jttu/JTTU.pdf
upon for the contribution of ad space, after which graphic design begins on ad production. A JttU t-shirt (unique for each year) is designed for distribution to all participating school principals, master teachers, scientists, and engineers, and ambassadors. A new design is also created each year for banners placed at schools as well as JttU “conference” bags that are distributed at workshops.

JW MINUS 3 MONTHS: Banners are provided to our local airport and placed at strategic locations so all visitors and residents will have advance notice about upcoming JttU programs. Participating schools hang their banners and promote JW on the billboards and other highly visible locations. All resource materials are purchased including binders that are “populated” with relevant information for each astronomy educator and ambassador. The information included in these binders includes phone contacts for classroom teachers, schedules, and specifics such as where parking is located at schools. Schedules for up to ten talks presented at the family science events are finalized and all observatories are advised of these events and asked to participate if desired.

JW MINUS 2 MONTHS: Astronomy educators receive notification of assigned classrooms and information binders are distributed. Presenters can contact their assigned teachers and develop their presentations. An astronomy educator workshop provides classroom presenters with opportunities to ask questions of education experts and presentations from the past are shown along with resource materials and discussions on suggested outcomes. The local Department of Education administrative staff work with participating schools on various JttU events held during the upcoming JW. Programs are designed and printed for family science events.

JW MINUS 1 MONTH: Leaders from the JttU team meet weekly during the month prior to JW. All team members are expected to devote 100% of their time to assure that events run smoothly and all reasonable problems are anticipated. Most pending invoices are committed or paid at this time and businesses are notified of the JW schedule to assure their attendance at family/public events. Speakers are contacted and given an opportunity to visit venues where their talks will take place. As one of the many personal touches, supporters gather to make almost 200 lei for participants. These little details have a disproportionate impact and are greatly appreciated – as indicated in evaluations and informal responses by participants.

JW BEGINS: During the JW three workshops are held; one for the master teachers, one
for classroom teachers, and another for astronomy/science educators. Also, one family science event is held during the weekend prior to the period of classroom visits. Although the program grows each year, an average JttU year brings over 50 astronomy/science educators into over 370 classrooms (see Figs. 7 & 8). During JW the community is abuzz with excitement and students tell families and friends about the scientist who visited their classroom. The result is that JttU is talked about at dinner tables, social events and anywhere people gather, making it difficult for anyone living on the east side of the Big Island to not be touched by the program. As the last day approaches all participants are extremely gratified by the knowledge that they made a difference – our keiki (the Hawaiian word for children) and our community are much richer for the experience.

6. Resources

Each year, to accomplish the myriad programmatic elements identified in the previous sections, the JttU team, led by the Public Information and Outreach Office\(^\text{18}\) of the Gemini Observatory, brings together a diverse set

\(^{18}\)http://www.gemini.edu/pio/?q=pio
of individuals all of whom are instrumental in implementing the program. These include (but are not limited to):

- Mauna Kea observatories outreach staff and managers;
- Local Department of Education administration and support staff;
- Local informal science educators;
- University of Hawai‘i at Hilo educators;
- Local business leaders;
- Individual volunteers from business and community (ambassadors);
- Observatory engineers, scientists and other interested staff.

In addition to these human resources, many other monetary, services, and non-human (tangible) resources are provided by community and business partners (see Table 1 for a complete list of local businesses participating in Journey in 2011). Resources sponsored by local business include:

- Media (newspaper/radio) promotional donations;
- Prizes, gifts and t-shirts;
- Food and refreshments;
- Facilities;
- Transportation;
- Guest accommodations.

An additional level of human resources are required for logistics and planning that are provided on a regular basis, including (estimated):
Gemini Public Information and Outreach Staff: 0.95 FTE
Department of Education Staff & Teachers: 0.90 FTE
University of Hawai'i at Hilo: 0.05 FTE

The resources assembled for JttU in east Hawai'i to support STEM education are also much appreciated by local educators as expressed by the local Department of Education District Superintendent of the Hilo/Laupahoehoe/Waiakea District Complex Valerie Takata:

“This grassroots effort of the education entity, astronomy centers, and the business community working together toward common goals has been absolutely stellar. What an amazing opportunity for all of us to tap the resources within our community and to make a difference! We are investing in our students, teachers and community and in our future; therein lies the potential and strength.”

7. Evaluation and Metrics

JttU is evaluated and metrics assessed each year based on evaluation instruments originally developed by the national JttU program. Participation in a post-workshop questionnaire is required for all teacher and astronomer education workshop attendees and these are collected at the end of each workshop. These instruments assess the quality and effectiveness of the presenters and the workshop content; the perceived quality of the educational materials; and the workshop’s logistical arrangements and comfort of the venue. The questionnaires ascertain both quantitative and qualitative data and allow for open-ended commentary.

In addition, each classroom teacher who hosts a scientist, engineer or other staff presenter is required to complete an evaluation of the presenter as well as other key aspects of the JttU classroom program.

All evaluation data is compiled each year and used to improve the program in future years. In addition, an annual “Lessons Learned” meeting is held to solicit input from key staff, teachers and others involved in the implementation and execution of the program. Some of the results of these sessions are presented in the next section of this paper.

Another key metric of JttU success is simply the sustained engagement of educators, participating scientists and engineers, as well as the community at large. Tables 1 & 2 present some of these key data that illustrate this metric and reveal the success of the program in terms of impact and overall engagement of a diverse cross-section of our community over a sustained period of time.

19 http://journeythroughtheuniverse.org/program_overview/po_as.html
20 http://www.gemini.edu/eval
TABLE 2. Key data from JttU over seven years of implementation (2005-2011). These data reflect the sustained interest and participation of the community in JttU and provide an indication of the magnitude of the program’s impact to a relatively small community in East Hawai’i (population ~50K).

<table>
<thead>
<tr>
<th>Year</th>
<th>Astron. Educ.</th>
<th>Amb.</th>
<th>Schools</th>
<th>Students</th>
<th>Classrooms Visited</th>
<th>Teachers Trained</th>
<th>Public Events</th>
<th>Partcpts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>7</td>
<td>10</td>
<td>17</td>
<td>5000</td>
<td>115</td>
<td>134</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>11</td>
<td>12</td>
<td>21</td>
<td>8000</td>
<td>370</td>
<td>134</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>33</td>
<td>15</td>
<td>18</td>
<td>8012</td>
<td>300</td>
<td>110</td>
<td>760</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>43</td>
<td>21</td>
<td>21</td>
<td>7409</td>
<td>332</td>
<td>102</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>45</td>
<td>27</td>
<td>21</td>
<td>8010</td>
<td>353</td>
<td>105</td>
<td>1700</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>35</td>
<td>24</td>
<td>18</td>
<td>5833</td>
<td>330</td>
<td>137</td>
<td>3000</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>47</td>
<td>35</td>
<td>18</td>
<td>6483</td>
<td>310</td>
<td>110</td>
<td>3200</td>
<td></td>
</tr>
</tbody>
</table>

Finally, while evaluations and participation data make up the core of JttU metrics, the value of verbal testimony by teachers and participants cannot be understated. The following statement by Christine Copes, Master Teacher at Hilo’s Waiakea Elementary School captures the spirit that many local educators bring to the program:

“I have benefited both professionally and personally for the Journey program, from the quality of the teacher workshops to the connections with world-class scientists and educators. When students are given the opportunity to engage in relevant, exciting, and age-appropriate science and astronomy activities, they remain attentive, focused and involved. Because of this involvement, they comprehend the content, and very often follow up with the quest for more information on the science topic.”

8. Best Practices and Lessons Learned

Over the course of JttU in Hawai’i many lessons have been learned and mistakes made. For example, when JttU classroom visits began, it was common to hold presentations for 100-200 students in an auditorium setting. At that time there were essentially no limits on the number of students allowed in a single presentation. However, it became obvious that quantity was not conducive to a quality experience for students and now (whenever possible) no more than two classes (60 students maximum) are allowed at a single presentation.

Another adaptation based on lessons learned in Hawai’i involves the four education modules originally provided by the JttU national program. This
The Hawaiʻi JtU district educator supervisors determined early in the implementation of JtU that the modules needed to be aligned with the Hawaiʻi State Science Standards to be effective, useful and most importantly, used by local teachers. A considerable effort assured this alignment and the four modules are now rotated through the program on a four-year cycle. Furthermore, since teachers are better suited to present these lessons from curriculum, the observatory classroom presenters were encouraged to develop their own presentations, independent of the JtU education curriculum module themes. This resulted in observatory staff presenting even more inspiring and personalized presentations and developing their own lessons/activities and better allowing them to share how they became interested in science and relate better to students and teachers.

Originally, scientists from the observatories went into classrooms without any encouragement or mechanism for contacting their classroom teachers in advance. However, the partnership and bond formed when the astronomy educator and teacher have an opportunity to discuss specific subjects in advance is highly beneficial. When the astronomy educators know in advance what particular state science standards are most appropriate their presentations can become more relevant and valuable to teachers and students. This simple exchange allows teachers to more easily justify taking a day of “regular” lessons and replacing it with a JtU classroom presentation without losing valuable content standards teaching time. Teachers also have the opportunity to invite the visiting science educators back into the classroom for further instruction on their topics.

Many observatory staff (not only astronomers) expressed a strong desire to go into classrooms but had no previous experience with K-12 students. Others felt that their work would not be interesting to students. In order to address these concerns, and encourage a diverse cross-section of observatory staff to participate in JtU, a system now exists in which new observatory staff participants can partner with a more experienced “mentor” who has participated in the JtU program in previous years. This provides new participants with the confidence to address a classroom of elementary students and also expanded our network of classroom educators to include engineers and observatory support staff at all levels.

Finally, the idea of asking for funding to support JtU at any level is critical. While it is difficult to ask businesses or even the local chamber of commerce to support our activities financially, there is no better way to inspire loyalty, commitment and buy-in to a program than to make an investment of resources financial or otherwise. We believe that this is a significant component of the JtU program in Hawaiʻi and a key reason...
why this program is so successful and continues to be sustainable and even grow year-to-year.

9. Adaptation to Other Communities

The JttU program in Hawai’i is unique. It is widely acknowledged that there is an abundance of scientists available to participate in the program on the island of Hawai’i as there are 12 well-staffed observatories on Mauna Kea. However, in most communities there is a local (or nearby) university or college along with an amateur astronomy club that would likely be willing to work with their local educators. As is commonly stated, astronomy is a “gateway science” and can be easily integrated into physics, biology, engineering, chemistry, mathematics and other disciplines. Most communities, both large and small, have the resources to establish a sustainable variation of the JttU program that reflects their own strategic needs in STEM education and focuses on their strengths and even local geo-physical/political environments.

This is why Gemini is currently (2011) implementing a variation of the JttU program in our host community (La Serena) in Chile. While the planned (pilot) program is significantly different (and much smaller – for now) than the program in Hawai’i, it integrates the core model of scientists and engineers interacting directly with the community, students and teachers.

10. Future Plans

As plans develop for the 2012 JttU program in Hawai’i expansion into a partnership with the University of Hawai’i at Hilo School of Pharmacology and their undergraduate chemical engineering program. JttU 2012 will likely see the addition of at least two University of Hawai’i at Hilo professors from the Engineering and Pharmaceutical Departments. It is also proposed that JttU’s master teachers be offered a one-week course in basic engineering concepts prior to JttU 2012. Local education advocate Jim Kennedy, (who also serves as the head of the Workforce Development Board for the County of Hawai’i) states, “This is a great example of the sort of self-starting, outside the traditional boxes, collaboration of community resources that the Workforce Investment Board is seeking to encourage.”

The possibilities of adding other STEM resources that are available in a community are as limitless as the boundaries one sets in defining the content of our universe!

http://www.gemini.edu/node/11609
11. Summary and Conclusions

The JttU program in Hawai‘i is the Gemini Observatory’s flagship outreach program at the Gemini North facility in Hilo Hawai‘i. It has proven, by its sustained growth and expansion into new partnerships and content directions, to resonate with our local education, business, and general publics and is expected to continue to impact our local community for many years to come.

The model it provides for other communities is viable and adaptable for a wide variety of circumstances and resources. With seven years of delivering JttU to the Hawai‘i community, it is obvious that the program not only fills a need but has also produced a valuable resource for educators and parents that will guide and inspire the next generation of explorers.

“After seven years of experiencing Journey classroom presentations firsthand and now enrolled at UHH to obtain my astronomy degree, it was great to be back in the classroom inspiring and taking the role of the educator during Journey through the Universe week.”

[Kellen Bello, University of Hawai‘i at Hilo student and JttU alumnus]