LDEO Diversity Plan
2011-2014

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LDEO Directorate
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Lamont-Doherty Earth Observatory

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Executive Summary of LDEO Plan for Diversity 2011-2014

This document lays out the LDEO Diversity Plan for 2011-2014 by the LDEO Directorate via the Office of Academic Affairs & Diversity (OAAD). The LDEO Directorate recognizes that diversity issues are inextricably linked to academic affairs, and so this plan emphasizes the need for diversity issues to be integrated into academic affairs. These include, but are not restricted to, appointment and promotion processes, salary structures, search procedures, LDEO-wide governance and policy making.

The OAAD was established in 2008 after an NSF-ADVANCE report that revealed that women and minorities were poorly represented among the scientific population at LDEO. Approximately 20% of the research scientists were women, that proportion declining as rank increased, with women consistently reporting a more difficult work environment than men. Concerns were also raised about hierarchy between officers of instruction and officers of research. Poor representation of women and minorities is typical in STEM fields – data from NSF and the US Census Bureau indicate that approximately 88% of doctoral degrees in the earth and environmental sciences are awarded to Caucasians, and 70% of all such doctoral degrees are awarded to males.

The recommendations of the NSF-ADVANCE committee were to improve the institutional climate by promoting awareness of subconscious bias and stereotype threat; to improve the status of scientists with respect to faculty; to promote a more diverse work environment; to adopt family friendly policies; to increase accountability; and to diversify LDEO by increasing the number of women and minorities in scientific and leadership positions.

Two different interpretations of “diversity” are relevant here: gender and racial/ethnic diversity, which have been the main focus so far; and a broader definition of diversity that includes age, sexual orientation, and disability status that we hope to promote awareness on over the period 2011-2014.
Most categories of LDEO scientists have shown an increase in the proportion of women compared to 2005 levels, with the most significant increase being the number of junior women scientists on the Lamont Research Professor track – doubling from 18% in 2005 to 36% in 2011. With respect to racial/ethnic diversity there has not been much progress and this document clearly explains the challenges associated with trying to increase racial/ethnic diversity as opposed to gender diversity.

In addition to the research scientists at LDEO, postdoctoral scholars form a key group with more diversity than any other group at LDEO, with approximately half the postdoctoral scholars being female and about a third non-Caucasian. Increased retention of postdoctoral scholars will have a positive impact on the overall diversity at LDEO.

There are eight main areas of focus in the LDEO Diversity Plan 2011-2014:

1. Pipeline Development – this is our single largest challenge pertaining to URM (under represented minorities) diversity. LDEO is committed to increasing outreach to URM populations over the next few years with the goal of creating a pipeline connecting these students to careers in Earth Sciences.

2. Proactive Diversity Hires – there are currently very few senior women scientists at LDEO; our goal is to increase the number of senior women through Target of Opportunity hires over 2011-2014.

3. Search Committees – starting in 2009 new guidelines and procedures were put in place for search committees; these led to a dramatic increase in the diversity of the applicant pool (see Fig 6), with almost 50% of new hires over 2009-2010 being either female or racial/ethnic minority.

4. Awareness and Outreach – greater awareness of the workings of the institution enable greater transparency and accountability. Detailed information on salary structures, demographic composition, LDEO governance and policy making have
been widely disseminated to the entire LDEO population, via email and publicly on the LDEO Directorate website: http://www.ldeo.columbia.edu/academicaffairs

5. Advancing Junior Staff – this includes the Summer Research Life Series (aimed at providing career guidance to junior scientists), the Lamont Leadership Forum (that provides a platform for junior scientists to discuss ideas pertaining to career development), the newly instituted Postdoctoral Mentoring Plan (that expects mentors to take a proactive role in guiding their postdoctoral scholars), as well as two new initiatives: the Women’s Leadership Program (that will allow women to participate in specific leadership activities) and the Junior Scientist Mentoring Survey (that will provide information on mentoring all junior scientists and not just postdoctoral scholars).

6. Visibility of Women and Minorities – this includes the Marie Tharp Fellowship, the Director’s Science of Diversity Seminar Series, the LDEO Divisional Seminar Series, the Women in Science Networking Event, and the Excellence in Mentoring Award.

7. Institutional Support and Family Leave Policies – this includes paid time off for family leave, stop-the-clock provisions, a daycare center, a lactation room, and the ability to work part-time without losing full-time status. These are especially important since research shows that women tend to bear the brunt of familial responsibilities.

8. Institutional Research & Data Collection – this will include the creation of a database tracking where LDEO postdoctoral scholars go when they leave LDEO and their reasons for leaving; a study analyzing letters of recommendation for male versus female applicants for LDEO postdoctoral positions; increased research and awareness on the broader concept of diversity including age, sexual orientation, disability status and any other appropriate indicators; and the creation of different databases for the purpose of undertaking future longitudinal studies.
In summary the LDEO Diversity Plan 2011-2014 is based on introducing new efforts and initiatives and continuing and expanding the concerted efforts in recent years. There has been visible and measurable progress since the creation of the Office of Academic Affairs & Diversity and our goal is to sustain these efforts and this momentum into the future.
LDEO Plan for Diversity: 2011-2014

Introduction

This document lays out the LDEO Diversity Plan for 2011-2014. The implementation of this plan is the responsibility of the LDEO Directorate through the Office of Academic Affairs & Diversity (OAAD). Created in 2008, this office was set up as a response to the recommendations of the NSF-ADVANCE program at the Earth Institute (2004–2009), the goals of which were to:

- Change the demographics of the science and engineering community at Columbia through innovative hiring practices and by targeting women and minority leaders;
- Cultivate an environment that fosters and attracts women and minorities in science and engineering; and
- Stimulate an institutional cultural shift based on social science research about gender and race.

The LDEO Directorate recognizes that diversity issues are inextricably linked to academic affairs, and that factors influencing diversity therefore need to be integrated into academic affairs. Accordingly, OAAD participates in those efforts and decision-making processes that impact both academic and diversity issues (including processes relating to appointments & promotions, salary structures, LDEO-wide governance and policy-making). The goals of this office are to:

- Institutionalize the findings and recommendations of the ADVANCE program
- Develop and implement new policies, procedures and programs with regard to increasing the number of women and minorities among the scientific staff
- Foster career advancement of junior scientists and postdoctoral scholars
- Improve the quality of the work environment for all by adopting proactive policies and increasing institutional accountability.
The remainder of this document is comprised of the following sections:

1. The background against which LDEO’s diversity efforts have been initiated
2. LDEO demographics and the challenges they pose
3. Strategic focus areas for diversity over the period 2011-2014
4. Additional information and concluding notes.

This document is accompanied by the document entitled “LDEO Diversity Initiatives 2008-2011” that provides an overview of the activities of OAAD over the period 2008 – 2011.

Background

Staff diversity initiatives have been a core function of the LDEO Directorate beginning with the directorship of G.M. Purdy. In particular, OAAD was established in part to improve coordination and communication with Columbia’s centralized diversity offices and programs. Quantitative and qualitative baselines were established through the administration of a work environment survey by the ADVANCE project in the spring of 2005. This survey targeted both male and female scientists and covered topics such as work environment, professional employment, diversity, work-life, and demographics. The findings of this report showed:

• Approximately 20% of research scientists were women. That proportion declined as rank increased.
• Women respondents consistently reported experiencing a more difficult work environment than men. They reported receiving less respect from colleagues and perceived departmental / unit processes as less fair than their male colleagues.
• Women reported experiencing gender-related discrimination and adversity.
• Neither the men nor women surveyed believed that diversity was a goal of their department / unit.
• Concerns were expressed about the hierarchy between officers of instruction and officers of research.
• More than half the female respondents reported that their family responsibilities hindered their career advancement.
Regardless of gender, a significant proportion of scientists had been approached with outside offers, and both women and men were equally likely to translate an outside offer into a retention offer. There were also no significant differences in the work activities in which scientists were engaged. Men and women also reported similar participation as members and chairs of institutional committees as well as similar levels of involvement in national or international committees. Also, responses to the open-ended questions indicated that both men and women found the LDEO environment to be intellectually stimulating.

The recommendations of the ADVANCE committee as they related to LDEO were to:

- Improve the institutional climate by promoting awareness of subconscious bias and stereotype threat;
- Improve the status of Lamont-Doherty scientists relative to faculty;
- Promote a more diverse work environment;
- Adopt family friendly policies;
- Create incentives and accountability for mentoring; and
- Increase the number of women among the scientific staff and in leadership positions

While the Doherty track (Officers of Research) was quantitatively more diverse than the traditional faculty track (Officers of Instruction), this only amplified existing discussions on diversity and OoR vs. OoI inequities. The results of the ADVANCE survey served to precipitate more coordinated action on these issues. Lamont scientists voiced their concerns to the LDEO leadership using formal and informal channels. These were:

- **Gender-based inequity**: Diversity in the Doherty track existed despite a disadvantaged environment compared to assistance offered to Officers of Instruction – there were no family friendly policies, thereby disproportionately impacting women as the survey revealed that more than half the women respondents indicated that family responsibilities hindered their career advancement; no institution-wide studies comparing male and female salaries for each rank; and no clearly defined approaches or accountability for mentoring junior scientists, i.e. the stage at which women were more likely than men to leak out of the academic pipeline.
• *Job-based inequity:* Compared to faculty, the Doherty track was lacking in many regards – low job security; a 12-month academic year as opposed to a 9-month term for faculty; no time for paid professional development; and an overall perceived lower status than faculty.

The irony that the hiring flexibility offered by the Doherty track (a traditional soft-money position) offered an institutional path toward improving diversity became an important motivator for improving the career environment for Officers of Research at LDEO. This developed into a unique initiative to create a new track at Columbia for soft-money scientists employed at LDEO. This proposed new track, the Lamont Research Professor track, would ideally include some key benefits that faculty received, while at the same time take into consideration the requirements of a research environment where scientists are expected to raise funding to support their research. This new track would also offer a more sustainable structure for the soft-money environment that is an important part of LDEO’s historic record of success by offering greater security to the Lamont scientists. As a corollary, this would be expected to attract and retain more women in scientific ranks at LDEO.

*LDEO Directorate Response*

As a response to the concerns and suggestions raised by the Lamont scientists, as well as the findings and recommendations of the ADVANCE committee, the LDEO Directorate took the following steps:

• Implementing the creation of the Lamont Research Professor track, which came into effect July 1, 2010 upon approval by the Columbia Board of Trustees;
• Creating the Office of Academic Affairs & Diversity in October 2008, housed within the Directorate.
LDEO Demographics at a Glance

The Lamont Campus is the earth science campus of Columbia University and is home to approximately 500 full-time employees in scientific, staff, administrative and faculty positions. The individual units housed on the Lamont Campus are the following:

• Lamont-Doherty Earth Observatory (LDEO)
• Department of Earth & Environmental Sciences (DEES)
• International Research Institute for Climate & Society (IRI)
• Center for International Earth Science Information Network (CIESIN)
• Tropical Agriculture Program

The administration of the Department of Earth & Environmental Sciences (DEES) falls under the School of Arts & Sciences, while that of LDEO, IRI, CIESIN and Tropical Agriculture fall under the Earth Institute. The DEES faculty are members of the Lamont research staff and are part of the same intellectual framework. There is a symbiotic relationship between the Lamont scientists and DEES faculty concerning research directions, projects, and teaching. In addition, LDEO scientists frequently mentor graduate students enrolled in DEES degree programs. The management of LDEO and DEES – including strategic planning and hiring objectives - is closely coordinated. Accordingly, activities and strategies by LDEO impact DEES and vice versa – a fact that has been taken into consideration while developing the LDEO Diversity Plan.

Definition of Diversity

There are two different interpretations of “diversity” that are relevant here:

1. Gender and Racial/Ethnic Diversity: Diversity initiatives at LDEO have so far been based on this definition of diversity, a usage consistent with national research on diversity in the physical sciences. Within racial /ethnic diversity there is a distinction between “under-represented minorities” (URM) and “minorities” with the former
specifically implying Blacks, Hispanics and Native Americans, and the latter implying Non-Caucasians in general. Data from NSF and the U.S. Census Bureau indicate that approximately 88% of doctoral degrees in the earth and environmental sciences are awarded to Caucasians\(^1\), and only about 5% are given to under represented minorities\(^2\). At LDEO where approximately 90% of the scientists (excluding postdoctoral researchers) are Caucasian, racial/ethnic diversity implies all minorities and is not limited to URM.

2. **Broader Concept of Diversity**: This includes, but is not restricted to, diversity issues such as sexual orientation, age, faith, disability status, and mental health status to name a few. While there have been no specific efforts targeting these areas so far, we expect to address these topics over 2011 – 2014 and to promote awareness and develop policies as appropriate.

**Scientist Categories at LDEO**

Scientists at LDEO (excluding postdoctoral researchers) fall into one of three categories: *Lamont Research Professors* (formerly *Doherty Scientists*); *Research Scientists*; and *Staff Associates*. Each scientist is housed in one of six research divisions. The central oversight of all research divisions rests with the LDEO Directorate. The Office of Academic Affairs & Diversity is housed within the LDEO Directorate and is responsible for developing policies, programs and initiatives impacting academic affairs (such as new hires, promotions, salary structures and institutional support) and diversity issues (such as the racial composition and gender of the scientific staff). Recent efforts to promote diversity appear to have had an impact on the demographic composition of the scientific staff particularly with respect to gender, as shown in the figures below.

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\(^{1}\) *Statistical Abstract of the United States, U.S. Census Bureau, 2011*

\(^{2}\) “Women, Minorities and Persons with Disabilities in Science and Engineering”, *National Science Foundation, 2007*
Figure 1: LDEO Scientists by Gender 2005 - 2011

Figure 2: Junior Doherty Scientists/ Lamont Research Professors: Gender 2005–2011
Figure 3a: Doherty Scientist/ Lamont Research Professors: Race/Ethnicity 2005–2011

2005
N=69

2008
N=66

2011
N=74
Figure 3b: Research Scientists: Race/Ethnicity 2005 – 2011

2005
N = 12

2008
N = 14

2011
N = 15
Figure 3c: Staff Associates: Race/Ethnicity 2005 – 2011

2005
N = 39

2008
N = 37

2011
N = 42
Most categories of scientists show an increase in the proportion of women over time. This increase is most pronounced in the case of the junior scientists on the Lamont Research Professor track (Figure 2) where the proportion of women among junior scientists has doubled from 18% in 2005 to 36% in 2011. For this track as a whole the proportion of women has gone up from 17% in 2005 to 24% in 2011. For research scientists and staff associates these numbers are up from 15% in 2005 to 27% in 2011, and from 23% in 2005 to 29% in 2011 respectively.

With respect to race/ethnicity the overall change has been slightly worse overall than 2005 (Figures 3a, 3b, and 3c) though given that the changes occurred in both directions over the period 2005 – 2011, it is not possible to identify a trend. For the Doherty/ Lamont Research Professor track the proportion of Caucasians has increased slightly from approximately 81% in 2005 to 84% in 2011, the latter still being marginally lower than the 2008 value of 85%. For Research Scientists it has increased to 79% Caucasian in 2011 from 75% in 2005, this still being lower than the 2008 value of 93%. For Staff Associates the number of Caucasians has decreased from 89% in 2005 to 84% in 2011, this being greater than the 2008 value of 77%. The data suggest than an increased hiring of Caucasian women, without an increased hiring of racial/ethnic minorities has led to a slight decline in the overall percentage of racial/ethnic minorities within our scientific staff. Given that the absolute number of racial/ethnic minorities is very small, detailed statistical analysis is unfeasible.

The above data raise questions about why changes in racial/ethnic composition did not match the changes in gender composition of the scientific staff. National data on the earth sciences indicates some key differences between gender diversity and racial diversity. With respect to gender, our patterns are consistent with recent research\(^3\) showing that the biggest leak in the academic pipeline occurs during the postdoctoral years. The research also shows that women bear a disproportionate burden of familial needs compared to men – a result consistent with the ADVANCE survey. Without institutional support to accommodate these needs, women are less likely to advance in their careers at the same rate as their male

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\(^3\) "Staying Competitive: Patching America’s Leaky Pipeline in the Sciences", University of California at Berkeley & Center for American Progress, November 2009.
counterparts. This implies that it is possible for institutions to increase gender diversity by adopting proactive policies, thereby reducing the leak in the pipeline.

The leak in the LDEO pipeline is illustrated as follows: at the doctoral student level, the 2008 gender ratio was approximately 56% female compared to 44% male; at the postdoctoral level it was approximately 49% female and 51% male, and at the junior scientist level it was approximately 25% female and 75% male. This is consistent with what the research suggests. With a combination of various institutional efforts, the percentage of women at the junior scientist level has increased to 36% in 2011, a trend we hope to continue. It is also pertinent to point out that approximately 80% of the postdoctoral scholars are international, many of whom express intent to return to their home countries after their postdoctoral research at LDEO. Nonetheless, it appears to be within the capacity of individual institutions to increase the number of women in their scientist ranks.

Unfortunately this ability is severely limited in the case of racial diversity where as indicated earlier national level data indicate that Blacks, Native Americans, Hispanics, and Asians/Pacific Islanders taken together constituted approximately 5 percent of the doctoral degrees given out in the earth sciences and that approximately 88% percent of doctoral students in the earth sciences are Caucasian – implying that we do not have much of a pool to begin with. Figure 4 shows this “broken pipeline”, reflecting the situation in middle and high schools across the country and is not within the capacity of an individual institution, limiting the recruitment of such candidates. In this regard, however, our student demographics are better than national averages. The 2011 DEES data (Appendix 1) show 63% Caucasian students (as opposed to the 88% national average). However, less than 10% are URM indicating the need to try and create a pipeline of such students into the earth sciences. This is further discussed in a subsequent section.
Figure 4: Pipeline for Women & Under Represented Minorities

Postdoctoral Researchers at LDEO

Postdoctoral researchers are the most diverse group at LDEO, more balanced across race/ethnicity and gender than any other group (Figure 5). Almost half the postdoctoral scholars are female and a third non-Caucasian, most of this racial/ethnic diversity stemming from international Hispanics and Asians. Approximately 80% of our postdoctoral scholars are international and many express an intention to return to their home countries after their postdoctoral research at LDEO. Postdoctoral scholars (entry-level positions at LDEO) form a feeder pipeline into our scientific research staff positions. Based on 2008 data, approximately 38% of our postdoctoral scholars were promoted to junior scientist ranks at LDEO. Efforts to increase retention of postdoctoral scholars will have a positive impact on the overall diversity of the LDEO research staff. Institutional efforts are already under way to improve the quality of the postdoctoral experience – a subsequent section of this document describes these efforts and initiatives.

Figure 5: Postdoctoral Researchers by Race and Gender 2005 – 2011

2005
N=22

2008
N=27

2011
N=36
LDEO Diversity Plan (2011-2014)

With the creation of the Office of Academic Affairs & Diversity in 2008, there have been concerted efforts and initiatives targeting diversity. While it is too early to identify which efforts have been more successful than others, we can speculate that the combination of all of these efforts, along with strong support from the LDEO leadership, has enabled an increase in gender diversity. Using 2005 as the baseline, there have been measurable changes in the gender diversity of the scientific staff, while racial/ethnic diversity appear to present a challenge that indicate a need for a long-term strategy. This is addressed below. Some areas of focus for 2011-2014 for increasing diversity will build on what has already been put in place over the period 2008-2011, along with some new efforts. We expect that over the long term, the combination of all these efforts will generate measurable increases in the overall (i.e. gender and racial/ethnic) diversity of our scientific staff.

Strategic Areas of Focus

I. Pipeline Development
II. Proactive Diversity Hires
III. Search Committees
IV. Awareness and Outreach
V. Advancing Junior Staff
VI. Visibility of Women & Minorities
VII. Institutional Support & Family Leave Policies
VIII. Institutional Research & Data Collection

I. Pipeline Development

This is the single largest challenge pertaining to URM diversity at LDEO. Even our most diverse cohort (i.e. the postdoctoral scholars) owes their racial/ethnic diversity largely to international Hispanics and Asians. As mentioned earlier, the challenges pertaining to
racial/ethnic diversity are different from those pertaining to gender diversity, the main
difference being that in the case of racial/ethnic diversity there is a very poor pipeline.
While efforts to retain our postdoctoral scholars will increase racial diversity, this is mostly
non-URM diversity. LDEO is committed to increasing outreach to URM populations over
the next few years with the goal of creating a pipeline connecting these students to careers in
Earth Sciences. Given the lengthy gestation period of such initiatives it is unlikely that we
will see much change by 2014; however we hope to initiate efforts that will facilitate the
development of a URM pipeline in the earth sciences over the next 10-15 years. We expect
to reach out to the following units at Columbia:

- The Office of the Provost: Developing a pipeline into the earth sciences at Columbia
transcends any individual unit or department – the ultimate ownership of collective
efforts by different units at Columbia must rest with a central authority such as the
Office of the President or the Office of the Provost. The Council of Deans Meeting
Report entitled “Enhancing Faculty and Pipeline Diversity” in May 2011 distributed by
the Office of the Provost states that the Provost’s Office will assist with programming
and cross-Columbia initiatives. Pipeline development is one such area where the
oversight and assistance of the Provost’s Office are necessary. We hope to work with the
Provost’s Office towards pipeline development in the earth sciences in 3 specific areas:
  o Columbia-wide initiatives;
  o Continuation of our existing educational efforts that impact the pipeline;
  o Reaching out to other colleges in the NYC area to work towards developing a
    pipeline in the earth sciences;

- Department of Earth & Environmental Sciences (DEES): Over the period 2011-2014 we
  expect to work closely with DEES towards promoting diversity for the Lamont campus.
  While DEES administration lies with the School of Arts & Sciences, its location on the
  Lamont campus, its close interactions with LDEO scientists, its role in the governance
  of Lamont (via membership in the LDEO Directorate and the LDEO Executive
  Committee) and its efforts towards diversifying their faculty (Appendix 2) makes it an
  ideal department for LDEO to partner with. Expected activities over 2011-2014 are:
o The creation of a joint DEES/LDEO Diversity Plan by the LDEO and DEES leadership;
o Identifying ways to reach out to Historically Black Colleges & Universities (HBCU) and Minority Serving Institutions (MSI) to recruit graduate and undergraduate transfer students.

• The Earth Institute at Columbia University (EI): As the organizing unit for the earth sciences at Columbia, the Earth Institute plays a potentially significant role in developing efforts at pipeline development in the earth sciences. We plan to reach out to the Earth Institute for involvement and support of pipeline development efforts at Lamont.

Educational Efforts in Pipeline Development

Educational efforts play an important role in pipeline development. Appendix 3 lists the current educational efforts by LDEO scientists, some of which target K-12 populations. While these efforts are not necessarily diversity-driven, developing and strengthening the K-12 pipeline will most likely increase racial diversity as underrepresented groups enter science as a result of better outreach. In order to ensure sustainability of these programs, central oversight and institutional responsibility are necessary. One of the goals for 2011-2014 is to create the position of Associate Director for Education reporting to the LDEO Director as a member of the Observatory’s leadership team. The Associate Director for Education will be charged with overseeing and expanding K-12 earth and environmental science education & outreach programs at LDEO, and will work in partnership with colleagues across the University to strengthen parallel initiatives in other schools.

II. Proactive Diversity Hires

While the overall number of women has increased at LDEO, we still have very few women in positions of leadership. Only 5 out of 23 LDEO Executive Committee members are women, and only 1 out of 6 Associate Directors is a woman. Our goal is to increase the
number of women at the senior level through Target of Opportunity hires over the period 2011-2014. Efforts are currently under way to recruit a senior woman scientist at LDEO, with an expected start date in Fall 2011. At the junior level, Target of Opportunity hires will focus on racial diversity. While it is not possible to predict how many such candidates will be hired over the period 2011-2014, it is expected that the LDEO Directorate will seek out Target of Opportunity hires consistent with institutional goals and priorities. Such hires will allow us to be more selective than regular searches, enabling us to identify specific candidates who could be recruited to LDEO, this being based on priorities within research divisions (e.g. which research areas to focus on). The LDEO Directorate will also focus on cluster and dual hires as research has shown that these are effective methods of recruiting diverse candidates. The LDEO Directorate will also reach out to other department chairs within Columbia (such as E3B, Biology, Chemistry and EEE) to explore the possibility of joint appointments for new recruits between LDEO and these other departments.

III. Search Committees

Search committees play a crucial role in determining the demographic composition of new hires; accordingly awareness on diversity issues on the part of search committee members is crucial in promoting diverse searches. Starting in 2009, new guidelines and procedures for search committees were put in place to increase diversity among searches for scientific staff\(^5\). These guidelines were based on findings from social science research as well as recommendations from ADVANCE. These included information on best practices for searches, subconscious bias, composition of search committees, targeting diverse venues for posting jobs, and the inclusion of the Assistant Director for Academic Affairs & Diversity in all searches, with full access to applicant information, search committee composition, and demographics of the applicant pool. These new guidelines led to a dramatic increase in the diversity of the applicant pool\(^6\).

Figure 6a shows that 8 out of 10 searches over the period 2009-2010 showed applicant pools

\(^5\) Copies of “Resources & Guidelines for Search Committees at LDEO” can be requested from the LDEO Directorate.

\(^6\) Despite this increase, there has been very little increase in the percentage of underrepresented minorities (Blacks, Native Americans, and Hispanics) – a large portion of the above increase was from the increase of Asians in the applicant pool.
with greater than 70% diversity (i.e. female and/or racial minority), and 5 out of 10 showed a diversity of at least 80%. This is in contrast with the period 2007-2009 where only 4 out of 10 searches showed a diversity of more than 50%. Figure 6b illustrates the composition of new hires over 2009-2010 (excluding postdoctoral scholars, a diverse group compared to the rest of the scientific staff) showing that approximately half the new hires were either women or minorities. Following past hiring/retention/retirement trends, we expect to recruit 10-15 new hires over 2011-2014. If these trends are sustained we can expect to see visible differences in the composition of the LDEO research staff over the period 2011-2014.

**Figure 6a: Diversity in Applicant Pool for LDEO Searches for Officers of Research (Excluding Postdoctoral Scholars) 2007-2010**

(arranged by start date of search)

*Percentage Diversity*  
- Red: 2009-10  
- Blue: 2007-09

*Diversity calculated as the number of women and/or minorities as a percentage of the total number of applicants.*
IV. Institutional Awareness

Factors affecting diversity within an institution are often related to factors pertaining to academic affairs such as salary structures, appointments & promotions, institutional governance, and awareness on how decisions impacting the greater body are made. Greater awareness of the workings of the institution enable greater transparency and accountability. Since 2008 there have been sustained efforts to spread awareness on diversity issues and their close connection with academic affairs and institutional governance. The following information has been disseminated publicly in an attempt to promote awareness:

1. Salary comparisons based on race and gender among LDEO scientists at different ranks.
2. The demographic composition of LDEO officers of research by race and gender.
3. The demographic composition of invited seminar speakers by race and gender.

7 All of these can be made available upon request from the LDEO Directorate
4. A summarized version of the LDEO bylaws (that define how the Observatory is governed), written in an easy-to-understand format, making it easier to comprehend the workings of the LDEO leadership. This included information on promotions, appointments, and policy-making. We are in the process of implementing a revised version of the bylaws that will also be disseminated to the entire institution.

5. Information on subconscious bias and discrimination, as well as best practices for search committees to promote diversity among the scientific staff.

Over the period 2011-2014 we intend to continue and expand efforts aimed at promoting institutional awareness on the current state of the observatory with respect to diversity. This sort of information will be disseminated in at least two ways: one, via emails to members of the Lamont community; and two, via the website of the LDEO Directorate, specifically the OAAD website: [http://www.ldeo.columbia.edu/academicaffairs](http://www.ldeo.columbia.edu/academicaffairs). In particular, we will examine quantitative and qualitative salary and career differentials on an annual basis as an intrinsic component of the Observatory’s merit review process, which involves senior leadership. We will take corrective measures as needed.

V. Advancing Junior Staff

Retaining junior scientists and postdoctoral scholars (i.e. the most diverse groups at LDEO) will promote diversity within the overall scientific staff. This requires concerted efforts to help them advance within the institution. Some of the current efforts in place that focus on advancing junior staff are:

- **Summer Research Life Series**: This is a series of seminars and workshops held over the summer and are aimed at providing career guidance to junior scientists at LDEO. These sessions encompass a wide range of areas that are especially relevant to junior scientists. The 2009 and 2010 series included sessions on grant management; proposal writing; PI responsibilities; the workings of key federal funding agencies; promotions and career advancement within LDEO; postdoctoral mentoring; and research ethics and responsible conduct. Over the period 2011-2014 our goal is to
identify new topics of interest based on feedback from the junior staff, and to host a session on each topic at two-year intervals so as to avoid repetition.

- **Lamont Leadership Forum**: This is a platform for junior scientists to discuss and exchange ideas pertaining to career advancement. The various activities of this forum include:
  - **Hosting lectures**: Lectures benefiting junior scientists are held on an average of once a semester. Invited speakers have included: Candace Major, Program Director at NSF, who gave a talk on proposal writing (NSF is LDEO’s single largest source of federal funding); Brenda Ekwurzel, a senior climate scientist at the Union of Concerned Scientists, who gave a talk on careers in science policy and leadership; and Richard Hayes, Deputy Director of Communications at Union of Concerned Scientists, who did a workshop on scientists talking to the media.
  - **Awarding small grants**: Small grants (approximately $500.00) are awarded to junior scientists to attend leadership conferences. Four grants have been awarded so far.
  - **Postdoctoral Luncheon**: The annual postdoctoral luncheon with the Director allows postdoctoral scholars to meet with the LDEO Director and express their thoughts and concerns in an informal setting.

While there is no specific diversity target for the Lamont Leadership Forum or the Research Life Series, these events being open to all junior scientists regardless of gender or race, they foster an environment that promotes professional development and better mentoring – identified in various diversity literature as important factors in promoting diversity.

- **Postdoctoral Mentoring Plan**: In the fall of 2010 LDEO instituted a mentoring plan for postdoctoral scholars. This was based on discussions with postdoctoral scholars that were started at the 2009 Postdoctoral Lunch with the Director, along with the 2009 NSF requirement that proposals requesting funding for postdoctoral scholars must show how the postdoctoral scholar will be mentored. This plan is based on a
series of communications and interactions between the postdoctoral scholar and his/her advisor, and advises mentors to take a proactive role in guiding their postdoctoral scholars on career advancement. Mentors are expected to provide guidance on career paths, advancement within LDEO, and also help integrate postdoctoral scholars into the scientific community both internally and externally. This is still a new initiative and it is too early to assess any impact, but it has been well received by the postdoctoral scholars. The Office of Academic Affairs & Diversity has been collecting feedback from postdoctoral scholars on the quality of their mentoring experience. This feedback will be presented anonymously to the LDEO Executive Committee during 2011-2012, after which we expect to adjust/change the plan based on the feedback received, keeping in mind our diversity goals. Postdoctoral scholars are the most diverse group at LDEO, and efforts to improve the quality of their postdoctoral experience is expected to increase retention as they get promoted into junior scientist ranks, which will contribute towards diversifying the LDEO scientific staff. The LDEO Directorate will develop methods to promote this, as described in Section VII of this document.

Over the period 2011-2014 we intend to continue these ongoing efforts aimed at advancing the junior staff, and also initiate two new efforts:

- **Women’s Leadership Program**: As indicated earlier there are very few women in leadership roles at LDEO. Under this new program selected women will work closely with the Directorate to take on leadership roles and work alongside senior management on a specific set of activities. This will allow women to participate in the strategic thinking of senior management in institution-wide leadership activities. Details of how these women will be selected and the duration of this role are still being worked out.

- **Junior Scientist Mentoring Survey**: Following on the lines of the Postdoctoral Mentoring Plan, the idea behind this initiative is to track the mentoring that junior scientists receive at Lamont. This survey will cover topics like mentoring, career advancement and leadership opportunities. This is somewhat more complex than the
postdoctoral stage where each postdoctoral scholar is assigned a mentor, whereas junior scientists, especially those on the Lamont Research Professor track are not, leading to questions about who should be involved in mentoring them. This initiative is expected to be put in place over the period 2011-2014, after which the information gathered will be used to correct any institutional deficiencies identified in the survey.

VI. Visibility of Women & Minorities

Current research indicates that low visibility and recognition of women and racial minorities compared to their male colleagues contributes to leaks in the pipeline and women not attaining senior positions. Our goal over 2011-2014 is to expand efforts at increasing the visibility of women and minorities by continuing existing efforts and initiating new ones. These are outlined below:

- **Marie Tharp Fellowship**: Started during ADVANCE, this prestigious fellowship brings women scientists to Columbia to collaborate with earth scientists here for a period of three months. This fellowship carries with it a monetary award of up to $30,000 per fellow. Starting in 2010 this award was institutionalized in the LDEO Directorate (with support from the Earth Institute) and restructured to allow for a greater number of fellows per year. With active support from the LDEO collaborators, we have raised enough funds to bring in 4 fellows annually instead of 2 – a trend we hope to continue. In addition, as word of this fellowship has spread, the quality of the applicants has been increasingly outstanding, and has included a Minister for the Environment, and a former member of the Intergovernmental Panel for Climate Change (IPCC). The expectation is that these fellows will forge long-lasting ties with LDEO researchers, opening up the possibility of recruitment in the future, thereby increasing diversity among the scientific staff (a former Marie Tharp fellow is currently being recruited for a faculty position at DEES). A new activity of this program over period 2011-2014 will be to host Lamont-wide events where the Marie Tharp fellows will have a chance to meet with junior scientists at LDEO.
Director's Science of Diversity Seminar Series: This is aimed at exploring the causes and consequences of diversity in multiple domains using social and behavioral science research. This initiative seeks to disseminate research findings on the impact of diversity on scholarly excellence, given the past research that has shown that greater educational benefits are associated with more diverse academic communities. This series has raised awareness on the issue of diversity among the scientific staff within LDEO, and we expect to continue to generate this awareness. Invited speakers have included Claude Steele, Provost, Columbia University; Meg Urry, Chair, Yale Physics Department, and Director of the Yale Center for Astronomy and Astrophysics; Elizabeth Spelke, Director, Laboratory for Developmental Studies, Harvard University; Lisa Curran, Director, Tropical Resources Institute, Yale University; and Harriet Zuckerman, Senior Vice President, Andrew W. Mellon Foundation.

LDEO Divisional Seminar Series / Earth Science Colloquium: Every week, each division of LDEO has its own divisional seminar, and every Friday there is an Earth Science Colloquium where an invited speaker gives a talk to the whole Observatory. Most of these speakers are (or have been) white males. In the spring of 2010 the LDEO Directorate sent out a report to the Lamont community showing the demographic (gender) composition of the speakers for these seminars and urging the Lamont community to invite more women and minority speakers. Organizers of seminars were also individually contacted and encouraged to invite female and minority speakers. Over the period 2011-2014 a new strategy will be to provide funds from the LDEO Directorate to invite more women speakers to these seminars and the Colloquium.

Women in Science Networking Event: In the spring of 2010 the LDEO Directorate sponsored a networking event for junior women scientists (including postdoctoral scholars and graduate students) at LDEO. Approximately 60 women scientists from 14 institutions in the northeast region of the US attended this event. The goal was for Lamont postdoctoral scholars and graduate students to hear insights and advice from
senior women scientists on advancing their careers in a male-dominated field. Given that the research on women in science identifies networking as an important factor in keeping women in the pipeline (and a lack of role models as a reason why women leak out of the academic pipeline), the goal of this event was to connect junior women scientists at Lamont with senior women scientists both from Columbia and outside institutions. All participants were given a previously prepared list of topics for discussion, this list based on input from the participants prior to the event. Following the discussion at individual tables, there was a plenary discussion. This event was well received and an event summary was published in EOS (the weekly newspaper of AGU). This is expected to become a biannual event.

○ **Excellence in Mentoring Award**: This Lamont-specific award recognizes the importance of quality mentoring, which benefits the institution as a whole. Mentoring has also been identified as a key activity that can contribute to promoting diversity in the sciences. For the 2008-2009 award, there were no female nominees. The LDEO Directorate made efforts to spread awareness on the need to recognize and acknowledge the contribution of our female scientists alongside those of our male scientists. For the 2009-2010 award almost half the nominations received were for female mentors. We expect to continue hosting this award.

**VII. Institutional Support and Family Leave Policies:**

As of July 1, 2010 the Lamont Research Professor (LRP) track was implemented at LDEO. Some of the policies developed for this track were made after taking into consideration the results of the earlier mentioned 2005-2006 ADVANCE survey, especially with respect to institutional support and family leave policies. It is pertinent to note here that after ADVANCE provided funds to women scientists for back-up care, Columbia has now institutionalized back-up care, with the Office of Work Life providing assistance to all Columbia officers who need back up care for family members. A lactating room was also set up at the Lamont campus in 2009, the first at Lamont. The Lamont day care center,
located close to the Lamont campus has also benefited individuals with young children.

LDEO is a predominantly soft money institution where scientists are expected to raise their own funds to support their research. In such a situation, taking time off for familial responsibilities hinders career advancement in the absence of institutional support. The LRP track is a significant departure from the previous Doherty track and offer benefits that are comparable to faculty positions, some of which directly impact women and junior scientists.

Some of the key benefits of the LRP track include:

- Guaranteed salary for the duration of the appointment: junior scientists receive three-year appointments and senior scientists receive five-year rolling appointments.
- Moving from a twelve-month to a nine-month salary, similar to faculty, allowing the option to earn summer salary.
- Institutional support for parental leave in addition to institutional salary support: this support covers three additional months over a nine-month term.
- Paid professional leave: based along the lines of a sabbatical, this allows senior staff to receive paid professional leave after they have raised 6 (academic) years of funding.
- Stop-the-clock provisions for family leave: The promotion clock can stopped for one year (up to two times per individual) for new parents.
- Being able to work part-time without losing full-time status: this is especially important for junior women scientists who may be at risk of leaking out of the pipeline.

These policies are especially important since recent research has shown that women tend to bear a disproportionate impact of familial responsibilities. In addition, the biggest leak in the academic pipeline occurs during the postdoctoral years, a pattern confirmed at LDEO as well. Without institutional support to accommodate these needs, women are less likely to advance in their careers at the same rate as their male counterparts. While it is too early to

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8 “Staying Competitive: Patching America’s Leaky Pipeline in the Sciences”, University of California at Berkeley & Center for American Progress, November 2009.
measure the success of the Lamont Research Professor track in promoting diversity, based on the research on diversity, this track is expected to contribute towards recruiting and retaining women scientists, and address many of the concerns/problem areas identified in the ADVANCE survey. In 2008 the Office of Academic Affairs & Diversity reached out informally to individual women postdoctoral scholars to enquire whether they were inclined to pursue a career at Lamont after their postdoctoral research was completed. A large proportion of these women indicated that they were not inclined to do so, the most commonly cited reason being “lack of women-friendly and family-friendly policies”. In 2010 when this office reached out to individual postdoctoral women, a much larger proportion of them indicated that they would consider staying at Lamont, the primary reason cited being the additional benefits and security of the new Lamont Research Professor track. If this is indeed the case then by 2014 we expect to see measurable changes in the number of women scientists at Lamont.

Postdoctoral transition to junior scientist: As another component of institutional support, the LDEO Directorate will also put together start-up packages for certain postdoctoral scholars, based on institutional research goals and priorities and the postdoctoral scholar’s overall performance at LDEO. Start-up packages for these postdoctoral scholars will be developed in a manner comparable to those for external hires. Such an effort is expected to increase retention among the postdoctoral scholars and assist their career advancement.

VIII. Institutional Research & Data Collection

Another expected area of focus for 2011-2014 will be on analyzing institutional data, specifically in the following areas:

- The creation of a database tracking where our postdoctoral scholars go once they leave Lamont, and their reasons for leaving. With research showing that the largest drop-off occurs during the postdoctoral years, insights into the decision-making processes of postdoctoral scholars as to why they choose to stay in science or leave will be useful for formulating future policies on diversity. As this database grows over the years it will be
possible to carry out longitudinal studies, giving us a better understanding of why female scientists leak out of the academic pipeline during their postdoctoral years.

• A study analyzing letters of recommendation with the goal of comparing how these letters differ with respect to the race or gender of the applicant. This is following on the lines of the seminal Trix and Psenka (2003)\(^9\) study showing that letters of recommendation differed systematically for men versus women, with letters for men consistently containing more standout adjectives like “brilliant” or “superb”, and those for women with more grindstone adjectives like “hard-working” and “conscientious”. The LDEO study will analyze letters of recommendation for applicants for the prestigious Lamont postdoctoral fellowship over the period 2007 – 2011. With a sample set of approximately 1000+ letters it is expected that this study will provide insightful information on the way male and female scientists are portrayed professionally.

• Increased awareness and institutional research on the broader concept of diversity, going beyond gender and race/ethnicity to include sexual orientation, age, disability status and any other appropriate indicator. As a start, our goal is to survey the LDEO community to receive feedback on these topics, after which we expect to begin a formal method of institutional research on relevant topics.

• The creation of various databases for the purpose of undertaking future longitudinal studies in the following areas:
  o Demographics of LDEO scientists with respect to gender and racial/ethnic diversity from as far back as 1990 – in order to track changes over time
  o Demographics of undergraduate and graduate students in DEES – in order to identify any potential leaks in the undergraduate pipeline, and how these might impact the postdoctoral pipeline, the feeder/entry positions at LDEO.
  o Data on educational efforts that have had the largest impact on URM groups with respect to their retention in the earth sciences – to identify those efforts that we should focus on from a diversity standpoint.

Data on graduation rates from Historically Black Colleges & Universities (HBCUs) and Minority Serving Institutions (MSIs) – in order to identify where to focus efforts for outreach and pipeline development. Undertaking these longitudinal studies will provide us with insights that will allow us to formulate policies that further promote diversity at LDEO.

A Note on the LDEO Diversity Plan for 2011-2014

The strategic areas of focus outlined in this document are consistent with the guidelines given to us by the Provost’s Office (“Enhancing Faculty and Pipeline Diversity” May 2011). According to those guidelines, institutions are encouraged to focus on some key best practices such as:

- **Visible role of School leadership in articulating and championing diversity aspirations:** The creation of the Office of Academic Affairs & Diversity within the LDEO Directorate and the support given to its efforts and initiatives by the Lamont leadership are an indication of this best practice.
- **Target of Opportunity hires:** LDEO has made 2 such senior hires over the period 2010-2011, one male and one female, and intends to make more over 2011-2014.
- **Leadership’s role in faculty searches and the training and composition of search committees:** The search guidelines put in place in 2009 are doing exactly that, and data for search pools before and after these guidelines have been provided in Figure 5.
- **Strengthen pipeline through focus on underrepresented minorities:** As identified earlier, this is one of our biggest challenges. We need the support of the Office of the Provost and other units for this particular effort.
- **Constant attention to recruiting:** As indicated in this document, this is something we expect to continue doing.
- **Enhance faculty retention, advancement, and satisfaction through mentoring and professional development programs:** As indicated in this document, we have put in place a series of efforts aimed at advancing and retaining women and junior scientists.
A key point about LDEO’s diversity initiatives is that these concerted efforts were started a few years ago. Accordingly, an important part of our diversity plan over 2011-2014 is to continue building on the success of these efforts, combined with some new ones, as opposed to coming up with new strategies for each area of focus over 2011-2014, the latter being more appropriate for units and departments that do not already have diversity efforts and initiatives in place.

The focus of many of our diversity efforts and activities will evidence driven, where the findings generated from these activities will form the basis for assessing current performance and formulating new policies and initiatives. It is our intention over 2011-2014 to continue these efforts and initiatives for promoting diversity at LDEO, which we expect will lead to measurable changes in diversity.

Concluding Notes

The LDEO Diversity Plan 2011-2014 is based on introducing new efforts and initiatives as well as continuing and expanding the concerted efforts in recent years. There has been visible, measurable progress since the creation of the Office of Academic Affairs & Diversity, and we hope to expand and sustain these efforts into the future, and continue to spread awareness on the need to diversify our scientific staff. As is often the case with efforts aimed at inculcating a change in the prevalent mode of thinking, perceived credibility plays a role in influencing the ultimate success of various diversity initiatives. With the ownership of many of these efforts resting with the LDEO Directorate the perceived credibility is strong and the general feeling (especially among the junior staff) is that the institution is moving in a positive direction.

Some of our initiatives have already begun to have an impact. However, we need to keep in mind that for change to be permanent and deep-rooted, efforts need to be applied gradually and consistently over time. Stimulating an institutional cultural shift towards a more open, transparent, and diverse culture cannot be achieved overnight. Slow, constant pressure
applied consistently on the leadership over time, and continuous efforts at spreading awareness on social science research on diversity are vital elements needed to bring about the much sought after institutional change. Such efforts will not only promote diversity but will also position LDEO as a leader in institutional transformation, further enhancing LDEO’s leadership position within the scientific community.
Appendix 1
DEES Ph.D. Students by Race and Gender 2005 – 2011

2005
N=88

2008
N=79

2011
N=77
Appendix 2

DEES Full-time Voting Faculty 2005 – 2011
Appendix 3

Educational efforts involving LDEO scientists

• **Secondary School Field Research Program (SSFRP):** In this program, students and teachers spend the summer working together on research teams where they generate professional quality data and establish peer relationships with Lamont scientists and graduate students. Students learn science as a process, gain life skills outside the classroom, and come to see science, engineering and math as realistic career options. Teachers reconnect with their enthusiasm for scientific research and gain confidence with project-based learning techniques. Our primary educational partners are collaborating schools such as The Young Women’s Leadership School, the New York Harbor School, the Heritage School, the Washington Heights Expeditionary Learning School, Curtis High School, and a large number of middle schools for which we help to conduct integrated learning workshops. This program is funded by private foundation grants that a Lamont-Doherty scientist helped towards obtaining. In the five years since the program was established, we have worked with 75 students (90 percent of whom are members of ethnic groups under-represented in the sciences) and 15 public school science teachers. To date, every graduate of this program has gone on to college, and five graduates of the program who are majoring in environmental or marine science have returned to Lamont to help manage the summer field research.

• **Columbia University Summer Research Program For Science Teachers (CUSRP):** Established 20 years ago, this Columbia University Medical Center program offers science teachers from New York City public schools a unique opportunity to engage in the hands-on practice of scientific research. Each teacher in CUSRP partners with a Columbia faculty member for two consecutive summers, working on original research projects and participating in weekly professional development exercises. As documented in a peer-reviewed Science article published in 2009\(^\text{10}\), this program has a long record of success measured by a significant increase in the rate at which students of participating teachers pass required New York State Regents exams in science, greater retention of those teachers in

\(^\text{10}\) Silverstein, C. S. et al. (October 2009.) “Teachers’ Participation in Research Programs Improves Their Students’ Achievement in Science.” *Science.* 326 (5951), 440-442. Available at [http://www.sciencemag.org/content/326/5951/440.full.pdf](http://www.sciencemag.org/content/326/5951/440.full.pdf).
New York City public schools, and both short- and long-term cost-effectiveness. Our goal is to expand this effort at LDEO.

- **Learning Through Ecology And Environmental Field Studies (LEEFS):** Funded by a five-year $3.1 million dollar National Science Foundation (NSF) grant, this program has been proposed and managed by scientists from LDEO and the Center for Environmental Research and Conservation (CERC), and makes use of CUSRP’s resources. About half of the participating LEEFS teachers complete the two-year internships and professional development activities of the CUSRP. LEEFS is primarily a graduate student Fellowship that extends the CUSRP and SSFRP programs by providing Columbia University graduate students as co-teachers in classroom and field education at participating schools during the academic year.

- **Technology, Research And Ecology Exchange With Students (TREES):** This is funded by a $1.2 million NSF grant. The LEEFS PIs also collaborate on CERC’s Technology, Research and Ecology Exchange with Students (TREES) project, which provides a three week summer institute for middle school science teachers. Some of these middle school teachers come from the LEEFS schools, and have graduate students to provide in-school classroom support during the academic year, as well as Columbia support for implementation of an integrated science curriculum.

- **School-Based Ecology And Environmental Discoveries (SEEDS):** The LDEO and CERC PIs involved in LEEFS and TREES were awarded a $0.4 million NSF grant, the School-based Ecology and Environmental Discoveries (SEEDS), which further extends the reach of the SSFRP. Under SEEDS Columbia is becoming the mentor to high school-based field science projects. This will allow for long-term, school-based environmental science projects supervised at four New York City public high schools. Projects include water sampling, nutrient cycling, air and water pollution monitoring, and ecological surveys in metropolitan area wetlands, on school roofs, and in the New York Harbor. The SEEDS projects will be primarily based at the high schools, with administrative and logistical support provided by the schools. Four teachers and eight students will have paid internships for four years; Lamont Doherty scientists and technicians will act as mentors to the participants, and the Earth Institute will administer the program and coordinate among its participants.
• **Data Puzzles: Science Education In The Classroom:** “Lamont Data Puzzles” are activities in which students interpret carefully-selected snippets of authentic science data to extract insights about the workings of the earth or environment. With a seed grant from NSF, a Lamont-Doherty scientist has developed an initial suite of six puzzles which have been published by the National Science Teachers Association Press, under the title Earth Science Puzzles: Making Meaning from Data. These puzzles allow students to experience the “aha moment” at the heart of scientific discovery, while strengthening their quantitative reasoning and knowledge integration skills, essential for the science/technology workforce. These data puzzles are developed in close collaboration with a team of master teachers, who test each puzzle in their classroom and help to identify student misconceptions and stumbling blocks. Further funding is sought to continue this work with the production of a second volume of data puzzles to expand the range of topics that can be taught through this innovative approach.

• **The Lamont Summer Intern & Earth Intern Program For Undergraduates:** Now entering its 30th year, the Lamont-Doherty summer intern program draws exceptional undergraduates to its campus from universities around the country. Each summer, approximately three dozen students work one-on-one with Lamont-Doherty scientists to conduct original research projects over a period of ten weeks. This work is supplemented with lectures, workshops, and field trips throughout the summer. This longstanding program measures its success by the lasting fellowship and inspiration it brings to students, the independent research it facilitates, and the many rewarding careers it has jump-started over the years.

• **A Day In The Life Of The Hudson River:** Organized with support from the New York State Department of Environmental Conservation, this program brings together more than 3,000 students from 60 participating schools – from Troy, NY to New York Harbor – to collect data along different sites along the river about currents, salinity levels, and vegetation. After analyzing and compiling their samples, students are able to construct a comprehensive picture of the dynamics along the Hudson River estuary. This growing program connects students to their local environment, and encourages them to contribute their own data as part of a larger sampling effort. Collected data are used in teacher workshops to develop curriculum pieces and learning activities for students.