Cover photos (clockwise from top left):

Jon Lampley; Carey Utz (center); Adam Tabbaa; Breonna Slocum
A cornerstone of the undergraduate experience at Ohio State is about exploration and discovery. It is a singular opportunity for our students to actively participate in solving the world’s most vexing problems, unearthing powerful truths, and exploring and expanding a passion for learning.

E. Gordon Gee, President

Ohio State has a time-honored commitment to finding and developing solutions to grand challenges. Our undergraduate researchers are vital collaborators in the effort to bring the results of our research prowess to the community.

Joseph A. Alutto, Executive Vice President and Provost

Engaging in research at the undergraduate level has proven to provide significant positive benefits to the overall quality of education, within the specific subject area in which the research is grounded, as well as in all other subjects that the student is engaged in. It also has a similar positive impact on the student's faculty mentor, and in fact the university at large sees the value of the experience.

Wayne E. Carlson, Vice Provost and Dean of Undergraduate Education

The Ohio State University is one of the world’s most outstanding and comprehensive research universities. The range of opportunities we provide for our students in the research arena is unparalleled. By working with our world-class faculty, our students truly do make a difference. We are proud of their contributions and impressed by the exciting careers they pursue after getting involved in research.

Caroline C. Whitacre, Vice President for Research
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Quote from an undergraduate researcher in 2012:

Research has been a transformative experience integral to both my personal and professional development. The opportunity to work independently on my own project, hold conversations with professors, and give a talk at a national conference during my sophomore year allowed me to develop and become confident in my own abilities. This led to me starting three organizations on campus and currently founding a company based on technology developed in my laboratory.

Kunal Parikh
The Undergraduate Research Office (URO)

**Direct**or: Dr. Allison A. Snow, Department of Evolution, Ecology, & Organismal Biology

**Interim Director:** Dr. Anne E. Carey, School of Earth Sciences (through March 2012)

**Assistant Director:** Helene Cweren

**Program Assistant:** Mara P. Penrose

**Graduate Administrative Associate:** Ashley C. Owens (through May 2012)

**Undergraduate Assistants:** Theresa Fisher (beginning September 2012)

  Rebecca Lieberman
  Jacqueline N. Lipphardt (through September 2012)
  Anthony Kiragu (beginning August 2012)
  Emily Schueller (beginning September 2012)
  Erika Sulecki (beginning September 2012)
  Tiffany L. Wang (through August 2012)

**2012-13 Faculty Advisory Committee**

Allison Snow (Chair)  Chair, Director of the Undergraduate Research Office  
Department of Evolution, Ecology and Organismal Biology

James Kinder  Interim Director of the OSU Agricultural Technical Institute  
Department of Animal Sciences

Kendra McSweeney  Department of Geography

Sarah Schoppe-Sullivan  Department of Human Development and Family Science

Amanda Simcox  Department of Molecular Genetics

Karl Whittington  Department of History of Art

Jessica Winter  Department of Chemical and Biomolecular Engineering

Linn Van Woerkom  Associate Provost and Director of the Honors & Scholars Center  
Department of Physics

*Ex Officio Members:*

Wayne Carlson  Vice Provost and Dean for Undergraduate Education  
Department of Interior, Industrial, and Visual Communication Design

Janet Weisenberger  Senior Associate Vice President, Office of Research  
Department of Speech and Hearing
2012–13 Student Advisory Committee

Co-Chairs:

Alex Chaitoff  Political Science/Microbiology
Breonna Slocum  Microbiology

Members:

Rachael Billock  Microbiology
Rashmi Borah  Philosophy/Microbiology/JUROS representative
Zach Davidson  Biology/Public Health
Sam Dubin  Neuroscience
Theresa Fisher  Speech and Hearing Science
Christine Fung  Biomedical Science
Chris Gaw  Biology
Brett Geiger  Biomedical Engineering
Nandan Gokhale  Microbiology
Grant Joslin  Anthropology/Business
Greg Kemper  Microbiology
Samantha King  Chemistry
Anthony Kiragu  Biology
Kerrianne Morrison  Psychology
Anastasia Purgianto  Food Science
Sara Schiavone  Criminology/Sociology
Ronald Siebenaler  Biomedical Science
Madison Spychalski  Chemical Engineering
Katherine Stanfill  Biomedical Science
Sam Stuard  Engineering Physics
Danny Yanes  Biology

The new URO offices are at 53 West 11th Avenue
Since its establishment in 2006, the Undergraduate Research Office (URO) has provided a central clearinghouse for information and a voice for undergraduate research at The Ohio State University. We strive to open new horizons for interested students from all academic disciplines. The URO has contributed to a surge of interest in research collaborations between students and faculty. 2012 was truly a year of change - we successfully adjusted to the switch to semesters, moved our office to a newly renovated, permanent home at 53 W. 11th, and began a transition year for taking charge of the Denman Undergraduate Research Forum, with assistance from the Honors & Scholars Center.

A few highlights from 2012:

- Our workshops, events, and short presentations in classes reached more than 6,400 students, including nearly 44% of the freshman class. This represents a 78% increase over 2011. We also offered a new Summer Research Fair in January to help student apply for summer opportunities.

- More than 6,700 students, faculty, and staff received email newsletters and announcements, which are also posted on Facebook and elsewhere. The URO website had a record number of 40,000 unique visits.

- Enrollments in courses for research credit continues to grow, having tripled since 2006 (2,454 in 2012).

- The number of seniors who completed a research thesis and graduated with “Research Distinction” rose to 339. We hope to see further increases in the next few years.

- The campus-wide Denman Undergraduate Research Forum continues to be the most significant undergraduate research event of the year, with 582 participants and >300 faculty judges in 2012.

- An all-time high of 371 students took part in our Summer Undergraduate Research Institute (SURI), a 10% increase in participation over 2011. ~300 SURI participants were OSU students and 206 were funded by summer research programs.

- 124 students gave presentations on their summer projects at the Fall Undergraduate Research Forum, which we co-sponsored with University Libraries, compared to 89 in 2011.

- The student-led, peer-reviewed Journal of Undergraduate Research at Ohio State, published JUROS: Oculus Award Edition 2012-2013 in collaboration with University Libraries. The editors celebrated with a memorable reception for authors and the OSU community.

- Allison Snow and Helene Cweren gave conference presentations and contributed to publications sponsored by the Council on Undergraduate Research, the leading national organization for undergraduate research.

All of this work could not have been accomplished without the hard work of many URO staff, students, and collaborators. I greatly appreciate the many contributions of our assistant director,
Helene Cweren, program assistant Mara Penrose, and a large crew of extremely enthusiastic volunteers and paid student assistants, including Rebecca Lieberman, Jacqueline Lipphardt, Anthony Kiragu, Tiffany Wang, Erika Sulecki, Emily Schueller, Jennifer Kmetich, Rashmi Borah, Alexander Tranovich, and more than 160 student volunteers who serve as Peer Research Contacts and ambassadors for our office. Dr. Anne E. Carey expertly served as Interim Director of the URO from June 2011-March 2012 while I was on sabbatical.

We also acknowledge on-going assistance from our Faculty and Student Advisory Committees, the Office of Academic Affairs, the Honors and Scholars Center, the Office of Research, and University Libraries. Ohio State’s increasingly talented pool of undergraduates, combined with world-class resources for research, continues to foster growth in faculty-directed student research projects. We are excited to support a campus-wide culture of helping students get involved in research.

Professor Allison A. Snow

Director
Strategic Plan for the Undergraduate Research Office

MISSION
The Undergraduate Research Office coordinates opportunities for undergraduate students to engage in meaningful research at The Ohio State University, a top public research university. The URO promotes many types of research-related activities in all academic disciplines.

VISION
We seek to integrate the dual missions of research and teaching at Ohio State, to enrich the undergraduate experience, and to become known as a national leader of campus-wide undergraduate research programs.

ACTIVITIES
- Introduce students to rewarding research experiences
- Help students find faculty mentors and funding
- Help students present their findings at local and national symposia
- Support the Denman Undergraduate Research Forum
- Promote recognition of student research accomplishments
- Help forge new connections between teaching and research at Ohio State

CURRENT STATUS OF THE UNDERGRADUATE RESEARCH OFFICE
Staff:
- 75% time Director (Professor Allison Snow)
- Full-time Assistant Director (Helene Cweren)
- Full-time Program Assistant (Mara Penrose/Jacqueline Lipphardt)
- 4-5 part-time undergraduate assistants

Budget for FY 2013: $366,091 for salaries, benefits, fellowships, supplies, and services

The Undergraduate Research Office offers year-round programming to facilitate and promote undergraduate research. We are a small office with a large mission that contributes to recruiting and educating highly motivated students in all fields of study. Much of our work is carried out in collaboration with other academic units, especially the Honors and Scholars Center. Our annual budget supports programs and events, offices and other room fees, computer services, publicity, brochures, maintaining the URO website, wages for part-time student workers, $21,000 for six summer research fellowships (matched by $21,000 from the Office of Research), and travel by the director and assistant director to one professional meeting per year. This funding is adequate for our current needs, but additional funds will be required to provide better and more easily obtained research experiences for our students. In 2012, our financial status became much more secure with the allocation of additional PBA annual funding from OAA.

Other major sources of annual funding for undergraduate research include more than $760,000 for research thesis scholarships (distributed by Honors and Scholars to college committees), $25,000 for educational enrichment grants (distributed by the Undergraduate Student Government), summer programs offered by other units, and funds from many other programs. The annual Denman Undergraduate Research Forum is funded by contributions from corporate and private donors, the Office of Undergraduate Education, and the Office of Research.
LONG-TERM GOALS AND BENCHMARKS

We plan to become known as a national leader in promoting undergraduate research at large public universities. Within the next ten years, we hope that all qualified students who seek an independent research experience will have this opportunity. Research experience in the STEM disciplines (Science, Technology, Engineering, and Mathematics) has been the focus of state and national initiatives to sustain science-related professions, but we also strive to increase research participation in other fields, including social and behavioral sciences, arts, humanities, architecture, economics, and business.

To take full advantage of Ohio State’s status as a top research institution, the URO provides a coordinated program that allows more undergraduates to gain meaningful research experiences. Most funding for undergraduate research activities is decentralized, provided at college, school, and department levels. Across campus, funding for undergraduate research is neither sufficient nor permanent, fluctuating from year to year. In particular, we urgently need funding for students’ summer research opportunities and travel to give presentations at professional meetings.

Our benchmarks established in January 1, 2009, are:

- During the next five years, we expect participation in Ohio State-sponsored undergraduate research forums to increase each year. This includes the Denman Undergraduate Research Forum and others sponsored by departments and colleges.
- During the next five years, we expect the numbers of students who complete a thesis and graduate “With Research Distinction” to increase annually.
- During the next five years, we expect the numbers of students who receive academic credit for research to increase annually.
- By 2013, we expect to see increases in the numbers of Rank 4 students in the STEM fields who have participated in research. Progress will be assessed using data from the 2013 National Survey on Student Engagement.
- During the next five years, we expect to generate additional funds from private donors and extramural grants to support undergraduate researchers.

PLANS FOR MEETING LONG-TERM GOALS

Progress toward meeting our benchmarks is described in this report. Some of our long-term goals can be attained by strategically focusing current resources and staff time on these priorities. However, current funding for running the Undergraduate Research Office limits possibilities for expanded services and new initiatives. Extramural funding is one means to increase services and initiatives. We have collaborated with other units on campus to obtain federal grants and foundation awards for undergraduate research. We will continue to pursue external sources of funding as such opportunities present themselves.
Metrics of Participation in Undergraduate Research

The most reliable indices we have found for evaluating trends in the numbers of undergraduate researchers at Ohio State include the number of students presenting at the Denman Undergraduate Research Forum, the number of research theses written, and the number of students enrolled for credit in research (Table 1). We view these data as indicators of research activity rather than comprehensive summaries. A complete accounting of undergraduate research is difficult because not all research projects culminate in a thesis or a presentation at the Denman Forum, and research activity may go unreported by academic departments or colleges. Each year, many undergraduates are coauthors of journal publications and papers presented at professional meetings, but we have no reliable methods for monitoring all of these achievements.

RESEARCH FORUMS AND EXHIBITIONS

The Denman Undergraduate Research Forum, created in 1996, continues to be our most visible, esteemed, and high-impact tradition for promoting undergraduate research. In 2012, participation in the Denman Forum was 582 students (Table 1). This was the first year that we did not see a major increase over the previous year (580 students in 2011), although participation has doubled since 2004. A majority of the presenters (62%) were students majoring in the Arts and Sciences (Table 2). Compared to 2011, participation by Arts and Sciences students increased, especially those majoring in Arts & Humanities, while the proportion of students in Engineering majors decreased. Participation by Honors students dropped from 62% in 2011 to 54% in 2012 (Table 1).

In the future, we hope to see continued increases in the numbers of students at the Denman Forum, although we are close to reaching the maximum capacity at RPAC, which is the largest venue near central campus. If necessary, we plan to add a morning session to the event to accommodate more students in the future. Starting in 2013, the URO will be taking over primary responsibility for organizing the Denman Forum, with continued and much-appreciated assistance from the Honors and Scholars Center.

Overall, we estimate that > 1097 student presentations were given at Ohio State in 2012 (Table 3). The Fall Undergraduate Research Forum, organized by the URO to showcase summer undergraduate research accomplishments, reached an all-time high of 124 students in 2012 (39% more than 2011).

RESEARCH THESES

In the 2011-2012 Academic Year, 339 students completed a research thesis and graduated with “Research Distinction” (Table 3). This is the highest number of students graduating with research distinction during the years for which data are compiled. 55% of research theses were written by students in the Arts and Sciences, while 17% were written by Engineering majors, and 9% by those in the Allied Medical Professions.

In February 2011 the Board of Trustees approved our proposal to change the Faculty Rules to allow non-honors students who complete a thesis to graduate with “Research Distinction” on their academic transcript, while Honors students may graduate with “Honors Research Distinction”. We estimate that ~76% of the theses completed by graduating seniors in 2012 were Honors theses (data from the Office of Enrollment Services; not including Art, Theater, Dance, or Music majors, which do not appear to offer both options). In 2012, the new research thesis option was used by ~82 graduating students who presumably were not in a formal Honors program.
ENROLLMENTS FOR RESEARCH CREDIT

Here we report data on faculty-mentored research courses from the 2011-2012 academic year, which can be compared directly with previous years prior to the recent switch to semesters (Table 1). Note that students who enrolled for multiple terms were counted more than once in this summary. The number of students who received credit for thesis research (783, 783H courses) increased substantially over previous years, as expected given the increase in completed theses. Likewise, the number of students who received credit for research (699, 699H courses) increased by ~10% in 2012 compared to 2011. Overall, the number of students enrolled for research credits has tripled since 2006, reaching 2454 course enrollments in the 2011-2012 academic year (Table 1). This increase in undergraduate research is consistent with national trends, and reflects heightened expectations of our students and faculty for student engagement in research.

NATIONAL SURVEY FOR STUDENT ENGAGEMENT

The National Survey for Student Engagement (NSSE), which is administered every three years, will be conducted again in 2013 and we anticipate using those data to assess our progress relative to other universities. Data from NSSE have the advantage of being drawn from a large, representative sample of Rank 4 students, most of whom are seniors. For this reason we are again including the 2010 results in this year’s report, along with those from 2004 for comparison (Table 1).

Ohio State students were asked if they have “worked on a research project with a faculty member outside of course or program requirements.” In 2010, 22.4% answered “yes”. Participation in research was especially high in natural and mathematical sciences (45.6%), social and behavioral sciences (23.8%), and engineering (23.9%). Across disciplines another 13.6% of student respondents in the 2010 survey reported that they “plan to” work on an undergraduate research project, for a total of 37.0% who have either done research or plan to. Those who “plan to” do research were probably juniors who had Rank 4 status due to accelerated progress and having completed AP courses in high school.

STUDENTS IN PAID SUMMER RESEARCH PROGRAMS

In 2012, we identified 212 OSU students who participated in various summer research programs at Ohio State, was was 12% more than in 2011 (Table 4). Most of these students received scholarships or stipends for full-time research with an Ohio State faculty member. Although some programs were not offered this year, others such as the NMS Mayers Fellowships increased substantially. Increases were also seen in Psychology URO Fellowships positions in Chemistry/Biochemistry, and several NSF-REU programs. Given the very high demand for summer research opportunities, we hope to see these numbers increase further through departmental contributions, extramural funding, and contributions from donors. Another valuable program is the Comprehensive Cancer Center’s Undergraduate Pelotonia Fellowships, which were established in 2010 and provided summer funding for 21 students in 2012 (Table 4).

Students who are funded by individual faculty members are not included in Table 4. Based on participation of ~300 OSU students in the Summer Undergraduate Research Institute (SURI), we estimate that individual faculty members and other sources supported ~100 additional OSU students during the summer. Moreover, an unknown number of students conducted summer research at other institutions or did not register with SURI.

FACULTY WHO USED THE URO WEBSITE FORM TO FIND STUDENT RESEARCHERS

In 2012, 75 faculty members used our targeted email announcements to find undergraduate researchers, compared to 53 faculty members in 2011. We continue to receive positive feedback
about their success in finding talented, well-matched students as a result of our announcements. We hope the number of faculty using our services will continue to rise as more faculty, postdoctoral researchers, and senior-level graduate students learn about our activities. This approach is especially useful for new faculty members and for those in the College of Medicine and other large research centers who have little direct contact with undergraduate students.
Table 1. Metrics of student participation in undergraduate research, 2004–2012

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<tr>
<td>A) Number of Denman Undergraduate Research Forum presenters</td>
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<tr>
<td>Total number of students</td>
<td>276</td>
<td>354</td>
<td>415</td>
<td>522</td>
<td>540</td>
<td>580</td>
<td>582</td>
</tr>
<tr>
<td>Percent who were Honors students</td>
<td>77%</td>
<td>66%</td>
<td>71%</td>
<td>68%</td>
<td>64%</td>
<td>62%</td>
<td>54%</td>
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</table>
| B) Number of research theses¹  
(per academic year; AY2012 is Summer 2011–Spring 2012) |
| Total number of theses | 292  | 277  | 285  | 271  | 292  | 314  | 339  |
| C) Number of students enrolled for research credit  
(total enrolled per academic year; AY2012 is Summer 2011–Spring 2012) |
| Total Research & Independent Study (783, 699, 693) | 6160 | 6306 | 6011 | 6670 | 6735 | 6601 | 6815 |
| Independent Study (693)³ | 5393 | 5478 | 4664 | 5061 | 4731 | 4404 | 4361 |
| Thesis Research (783) | 701  | 680  | 660  | 668  | 819  | 738  | 857  |
| Research (699)⁴ | 66   | 148  | 687  | 941  | 1185 | 1459 | 1597 |
| Total Research Enrollment (783, 699) | 767  | 828  | 1347 | 1609 | 2004 | 2197 | 2454 |
| D) “Have you worked on a research project with a faculty member outside of course or program requirements?”  
National Survey of Student Engagement, administered every 3 years⁵  
Percent of Rank 4 Ohio State students answering ‘yes’ (number of responses in parentheses) |
| All Students | 19.0%  
(447) | - | - | - | 22.4%  
(2434) | - | - |
| Arts and Sciences | 19.4%  
(216) | - | - | - | 26.0%  
(1184) | - | - |
| Health Sciences | * | - | - | - | 26.7%  
(221) | - | - |
| Other Professional Schools | 18.6%  
(210) | - | - | - | 17.5%  
(1018) | - | - |

¹ Too few responses

1. Data from Robert Vandyne, Office of Enrollment Services and Anne Krabacher, Honors and Scholars Center; Columbus campus data. Includes regular theses and Honors theses.
2. Data from Linda Katunich, University Registrar; Columbus campus data
3. Not all Independent Study (693) credits are used for research
4. Research credit (699/4998/4999) was a new option in AY2003
5. Data from Sheila Craft, Office of Academic Affairs; Columbus campus data from 2004 (random sample), 2007 (random sample), and 2010 (complete census; 25% response rate)
Table 2. Percent of theses and Denman poster presenters by college or school

(based on the college of the student’s major; theses listed per academic year; AY2012 is Summer 2011–Spring 2012, etc.)

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<thead>
<tr>
<th></th>
<th>Theses</th>
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<td>57%</td>
<td>59%</td>
<td>56%</td>
<td>55%</td>
<td>57%</td>
<td>64%</td>
<td>57%</td>
<td>62%</td>
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<td>Natural &amp; Math Sciences</td>
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<td>Social &amp; Behav Sciences</td>
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<td>Total number of theses or presenters</td>
<td>271</td>
<td>292</td>
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<td>339</td>
<td>522</td>
<td>540</td>
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### Table 3. Numbers of research and creative activity presentations at Ohio State, 2010-2012

<table>
<thead>
<tr>
<th>Quarter/Semester</th>
<th>Event</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<td>Winter</td>
<td>Dept. of Art BFA Exhibition</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Spring</td>
<td>Denman Undergraduate Research Forum—all disciplines</td>
<td>540</td>
<td>580</td>
<td>582</td>
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<tr>
<td>Spring</td>
<td>Undergraduate Research Forum at Ohio State Newark—all disciplines</td>
<td>15</td>
<td>10</td>
<td>11</td>
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<tr>
<td>Spring</td>
<td>Arts &amp; Sciences—Natural &amp; Math. Sciences Undergraduate Research Forum</td>
<td>106</td>
<td>97</td>
<td>88</td>
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<tr>
<td>Spring</td>
<td>Arts &amp; Sciences—Arts &amp; Humanities Undergraduate Research Colloquium</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Spring</td>
<td>College of Education &amp; Human Ecology Honors Poster Presentations</td>
<td>-</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Spring</td>
<td>College of Engineering Undergraduate Research Forum</td>
<td>35</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>Spring</td>
<td>College of Food, Agr., &amp; Env. Sciences Undergraduate Research Forum</td>
<td>29</td>
<td>33</td>
<td>41</td>
</tr>
<tr>
<td>Spring</td>
<td>2012 Arts Scholars Juried Exhibition</td>
<td>-</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>Spring</td>
<td>Dept. of Dance Senior Thesis Presentations</td>
<td>14</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Spring</td>
<td>Dept. of Art BFA Exhibition</td>
<td>52</td>
<td>60</td>
<td>39</td>
</tr>
<tr>
<td>Spring</td>
<td>Dept. of Design Spring Exhibition</td>
<td>54</td>
<td>54</td>
<td>50</td>
</tr>
<tr>
<td>Spring</td>
<td>Dept. of East Asian Lang. &amp; Literatures Undergrad Research Forum</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Spring</td>
<td>Dept. of Psychology Undergrad Research Colloquium</td>
<td>19</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Spring</td>
<td>Ohio State Medical Center Research Day</td>
<td>8</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Summer</td>
<td>Plant Molecular Biology and Biotechnology—Summer Undergraduate Research Experience Poster Session</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Summer</td>
<td>SROP Ohio State (sponsored by the Graduate School)</td>
<td>6</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Summer</td>
<td>School of Earth Science—Shell Undergraduate Poster Forum</td>
<td>9</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Autumn</td>
<td>Dept. of Art BFA Exhibition</td>
<td>23</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Autumn</td>
<td>URO Fall Undergraduate Research Forum</td>
<td>97</td>
<td>89</td>
<td>124</td>
</tr>
<tr>
<td>Autumn</td>
<td>College of Pharmacy Research Day</td>
<td>-</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Autumn</td>
<td>Mansfield Campus Undergraduate Research Forum</td>
<td>-</td>
<td>-</td>
<td>17</td>
</tr>
</tbody>
</table>

TOTAL number of students\(^1\) 1037 \hspace{1em} 1057 \hspace{1em} 1097

---

1. Some students presented at more than one event
### Table 4. Summer undergraduate research internships at Ohio State, 2008–2012

(Numbers of Ohio State students with scholarships or stipends; typically 10 weeks at 40 hours per week.)

<table>
<thead>
<tr>
<th>Program</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>URO Summer Research Fellowship</td>
<td>12</td>
<td>16</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Psychology–URO Summer Undergraduate Research Fellowships</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>EEOB-URO Summer Undergraduate Research Fellowships</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Holbrook Research Abroad Fellowships</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>University Honors Summer Research Scholarships</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Mayers Summer Research Scholarships (Natural &amp; Mathematical Sciences, Arts and Sciences)</td>
<td>14</td>
<td>13</td>
<td>14</td>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>Undergraduate Pelotonia Fellows (OSU Comprehensive Cancer Center)</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>35</td>
<td>21</td>
</tr>
<tr>
<td>American Heart Association Summer Undergraduate Research Fellowship</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Beckman Scholars Program in Biochemistry, Chemistry, &amp; Biomedical Science</td>
<td>-</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>CIC Summer Research Opportunities Program (SROP)</td>
<td>11</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Ohio State Biomedical Informatics Undergraduate Internship</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Research on Research (Learning Technology Services)</td>
<td>9</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Undergraduate Community-Based Research</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Summer Undergraduate Research Program in the Department of Biochemistry/Chemistry</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td>Shell Undergraduate Research Experience–Earth Sciences</td>
<td>8</td>
<td>20</td>
<td>10</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Summer Undergraduate Research Program in Astrophysics</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Physics Summer Research Interns</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Biology–Stone Laboratory REU (unpaid positions)</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Department of Economics Summer Undergraduate Research Award</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Center for Population Health and Health Disparities Undergraduate Summer Internships</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Plant Mol. Biology &amp; Biotechnology Summer Undergraduate Research Experience/Center for Applied Plant Sciences (2012)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Summer Research Internships in Plant Pathology</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Engineering Experimental Station Internship</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>College of Dentistry Undergraduate Research Program—Dr. Rudy Melfi Research Fellowship</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Summer Undergraduate Research Fellowships in the Pharmaceutical Sciences</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>NSF REU Mathematical Biosciences Institute</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>NSF REU Site—Molecular Genetics &amp; Biochemistry</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>NSF REU Nanoscale Science &amp; Engineering Center</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Ohio State students</strong></td>
<td>115</td>
<td>131</td>
<td>144</td>
<td>186</td>
<td>212</td>
</tr>
</tbody>
</table>
Year-Long Programming for Ohio State Undergraduates

OVERVIEW
The URO offers a full year cycle of programs to encourage and support student participation in research. We estimate that our workshops, events, and short presentations in classes reached more than 6,400 students in 2012, a 78% increase over 2011. Autumn Semester presentations to freshman survey courses alone reached approximately 3,200 students -- double that of 2011-- representing 44% of the class entering in fall of 2012.

Table 5. 2012 URO Programs-Academic Year

<table>
<thead>
<tr>
<th>Programs</th>
<th>Winter</th>
<th>Spring</th>
<th>Autumn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Informational Presentations/Workshops</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly Information Sessions</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Research with Human Subjects: IRB Training</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>International Research Panel or Info Session</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Finding Your Research Niche (with University Libraries)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer Research Opportunities - Planning Ahead</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poster Presentation Basics</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>OSU Summer Research Fair</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Student Panels</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JUROS: Steps to Publishing Undergrad Research</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spilling the Beans (How and Why I Do Research)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Table Talks: Peer Research Discussion by Field</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year Experience Success Series (4 sessions)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Thesis or Not?</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Grilling the Grads</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Pushing the Limit: Undergrad Research in Math &amp; Related Disciplines</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Faculty Panels</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mershon Faculty Panel (social and political science)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Faculty Perspectives on Undergraduate Research</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Undergraduate Education Colloquium (From Mexico to Ohio...)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Co-Presentations with Honors and Scholars</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intro to the Denman Forum</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Preparing and Presenting a Winning Poster</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Our programs generally attract high attendance and receive positive feedback on evaluations. We offer many standard programs that are repeated during the academic year (Table 5) and we continue to introduce new programming and collaborate with other offices. For example, in winter 2012 we introduced an OSU Summer Research Fair, and in spring 2012, we offered “Pushing the Limit: Undergraduate Research in Math and Related Disciplines”.

In addition to scheduled programs, we offer individual advising, both walk-in and by appointment. URO Peer Research Contacts, who receive coaching and supervision from our office, are also available to students who have questions about getting started. More than 160 Peer Research Contacts are listed by discipline on our website. These student researchers reported answering more than 130 student email inquiries in 2012.

COLLABORATORS
Entities across the Ohio State campus collaborate with us on programming. We gratefully acknowledge the ongoing contributions to our year-long programming of the Honors & Scholars Center, the Office of Responsible Research Practices, the Office of International Affairs, the University Center for the Advancement of Teaching, Career Connection, University Libraries, the Division of Natural and Mathematical Sciences, the Department of Psychology, Stone Laboratory, the Mershon Center for International Security Studies, Undergraduate Fellowship Office, Center for Emergent Materials, Office of Diversity and Inclusion, ASC Honors Advising, the Digital Union and the Office of Research.

EVALUATIONS
We distribute, collect, and summarize evaluation forms at each URO-sponsored event. This feedback has been helpful for improving our programs. The Student Advisory Committee, which meets twice each term, also gives the URO staff feedback on events and advice on proposed programs.

STUDENT INVOLVEMENT IN THE URO
Students’ enthusiastic participation is an essential part of the URO. Interested students have the option of getting involved as Peer Contacts, Student Advisory Committee Members, staff of the Journal of Undergraduate Research at Ohio State (JUROS), panel speakers, and volunteers at URO-sponsored events. We host a celebration each spring to recognize the many contributions of our students to Ohio State’s undergraduate research programs.

The URO continuously recruits experienced undergraduate student involvement in the office through a variety of means. Each year there is a formal call for new Peer Research Contacts and a group orientation. However recruitment of Peers Research Contacts is an ongoing effort especially in disciplines where greater representation is needed. In addition, underclass participants in the Denman Undergraduate Research Forum are invited to become involved with the URO, as are Ohio State participants in the Summer Undergraduate Research Institute (SURI) and winners of research funding and awards. URO staff also attends student poster forums around campus to speak directly with students about their research and about their interest in becoming more active within the URO. Informal identification of undergraduate research leaders occurs throughout the year.

PRESENTATIONS AND FAIRS
Over the course of the year, URO staff and volunteers participated in approximately 150 research-promoting events at Ohio State. Such events include seven campus fairs, 69 presentations to freshman survey courses, and 25 invitations around campus to talk about undergraduate research.
AUTUMN TERM
Much of our effort during the Autumn Term is devoted to outreach. In fall 2012 alone we gave 67 presentations to freshman survey classes, hosted four First Year Experience Success Series programs and two talks at Honors & Scholars and we participated in six campus fairs.

The main URO event during Autumn Term is the Fall Undergraduate Research Week and Student Poster Forum, held in 2012 on Friday, September 14, in the Buckeye Reading Room at Thompson Library. This year’s forum was again co-sponsored by University Libraries, a significant partnership for the URO. The purpose of the Undergraduate Research Week and Student Poster Forum is twofold: to allow students to present research from the previous summer, and to introduce incoming students to research opportunities at Ohio State. In 2012, 124 students presented 122 posters, and an estimated 900 students, staff, faculty and guests attended and viewed the Poster Forum; the total student attendance at the three panel discussions scheduled during the Research Week preceding the forum was 156.

Based on survey responses from 64 student presenters (52% response rate), we found:

- 91% were 3rd years students or higher
- 48% were presenting a poster for the first time
- 73% reported that they had been conducting their research for a year or more
- 95% expected to continue with their research in the coming semesters
- 55% were Honors students
- 53% utilized the URO’s website when working on their poster
- 61% reported that their faculty advisor stopped by to see their poster at the Forum
- 91% ranked the overall quality of the Poster Forum as above average or excellent

The Fall Student Poster Forum is proving to be an excellent introductory experience for many undergraduate researchers. As one participant remarked:

This was definitely a great experience to practice presentation skills and really see how well I understand my research.

While the Student Poster Forum is not a judged event, the URO has endeavored to provide formal feedback on posters and presentations in an effort to make the experience more meaningful. Each student presenter was assigned one other poster to view, comment upon, and return a feedback form. In addition, the URO Student Advisory Committee helped to organize student, graduate student and staff volunteers to return feedback forms on an assigned group of posters.

WINTER QUARTER
In addition to our ongoing programs (Table 5), we offered several Winter Quarter events in collaboration with other offices at Ohio State, such as the pre-Denman Forum workshops jointly presented with the Honors & Scholars Center. A Winter Quarter highlight was a program titled “From Mexico to Ohio: How Immigration Changes Our Food Landscape” featuring Dr. Jeffrey Cohen of the Department of Anthropology and attended by 110 students. The presentation led to lively discussion that continued during a reception.

SPRING QUARTER
The highlight of Spring Quarter is the Denman Undergraduate Research Forum. The Honors & Scholars Center organizes the overall forum but the URO is actively involved in planning,
publicizing, and co-hosting this nationally recognized event. The URO schedules pre-Denman workshops and markets the event on campus, in part with widely distributed publicity posters to encourage more students and faculty to attend the forum. We also coordinate the Distinguished Undergraduate Research Mentor Awards to recognize the role of faculty in undergraduate research (Appendix D). In 2013, our office will begin taking on more of the planning and execution of the Denman Forum.

**SUMMER TERM – THE SUMMER UNDERGRADUATE RESEARCH INSTITUTE**

The Summer Undergraduate Research Institute (SURI) provides ongoing communication and support, professional development and social programs, and a sense of community for undergraduate researchers on campus. Students in formal programs and those working independently with a faculty mentor are all welcome to participate. We also encourage registration from Ohio State undergraduates conducting research off campus (e.g. at other universities or abroad), as a mechanism for staying in touch and including them in the Fall Student Poster Forum.

**Table 6. Participation in SURI 2009-2012**

<table>
<thead>
<tr>
<th>Participation in SURI</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of participants</td>
<td>255</td>
<td>281</td>
<td>336</td>
<td>371</td>
</tr>
<tr>
<td>Change from previous year</td>
<td>+31%</td>
<td>+10%</td>
<td>+20%</td>
<td>+10%</td>
</tr>
<tr>
<td>• in formal programs</td>
<td>67%</td>
<td>63%</td>
<td>69%</td>
<td>70%</td>
</tr>
<tr>
<td>• from other universities</td>
<td>17%</td>
<td>16%</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>• in STEM disciplines</td>
<td>89%</td>
<td>87%</td>
<td>85%</td>
<td>90%</td>
</tr>
</tbody>
</table>

SURI 2012 was the fourth year of the program and included 371 total students, 81% of whom were Ohio State students. Of the Ohio State students, 91% stayed on-campus or were in the Columbus area, and 9% conducted research elsewhere.

SURI participation in 2012 increased by 10% over 2011 and 90% since 2008, the year SURI began. Only 10% of students conducted research outside of STEM disciplines, consistent with the observation that there are far fewer formal programs and funding opportunities for these students.

**SURI RECRUITMENT**

Recruitment for SURI occurs during the Spring Quarter/Semester when campus-wide communication is still possible. To reach potential participants, we take a two-pronged approach. First, we invite all 24 summer research programs on campus to be listed as official supporters of and partners in SURI. Supporting programs share their lists of summer undergraduate students and email addresses, allowing us to contact and recruit our target audience; 69% of SURI participants are from these formal programs. Second, we directly recruit undergraduates through our usual communication channels, such as the URO email listserv, Buckeye Net News, campus advisors, H&S Net, etc. A drawing for Barnes and Noble gift certificates is used as an incentive to encourage self-registration in SURI.

**SURI PROGRAMMING**

Summer programming emphasizes not only professional development opportunities but also social and sports activities. Attendance at events in summer 2012 was excellent, with no program having
fewer than 29 in attendance. Programs offered included the following, listed in the order of most to least attended:

- Kickoff Dinner and Ice Breaker Activities
- Personal Statement Workshop
- Resume/Cover Letter Workshop
- How to Write a Research Abstract
- August Research Progress Celebration (Ice Skating Party)
- Controversy in Research (ethics presentation with Dr. Lisa Cravens-Brown)
- National Fellowships
- NSF Fellowships
- What to Do with a PhD
- Poster Presentation Workshop

The URO continues to partner with other offices across campus and gratefully acknowledges Career Connection, University Center for the Advancement of Teaching, Department of Psychology, Center for Emergent Materials, Undergraduate Fellowship Office and the Office of Responsible Research Practices for providing expertise and presenting many of the SURI professional development workshops, increasing cross-campus cooperation and awareness of undergraduate research on campus.

The URO increased the number of faculty members who met with students over our weekly brown bag lunch sessions from 1 in 2011 to 4 in 2012. These brownbag lunches were very well received. As one student commented:

I liked meeting professors at the lunches...they all had great advice and had the possibility to become a great contact.

Sports participation continues to be popular with 173 (47%) of SURI students indicating an interest in getting involved in sports at the beginning of summer. The URO helped students establish an informal tennis tournament, two intramural soccer teams, two intramural volleyball teams, and twice weekly ultimate Frisbee games. Sports involvement continues to provide an excellent way for student researchers to balance their time doing research, manage stress, and to meet one another over the summer semester. The following comments from students reinforce the significance of SURI sports activities:

...sports were a great way to connect with people in a non-school related way...

It’s fun to do sports.

In addition to the above events, SURI participants received weekly emails from our student coordinators Tiffany Wang and Jacqueline Lipphardt. These emails included program updates and advice in the form of a “topic of the week.” This year’s topics included: The Research Life; Keep in Touch; Post-Graduate Options—Applying to Graduate School; Post-Graduate Options—Applying to Medical School; Presenting Your Research; Researching Away from Ohio State; and, very inspiring, a message from President Gee.
SURI ASSESSMENT
At the end of the Summer Semester, we administered an exit survey using Zoomerang, with a 16% response rate (59 replies).

Students’ favorite SURI program was once again the opening kickoff event, followed by the personal statement and resume/cover letter workshops. 41% reported that this was their first experience doing research; 9 out of 10 respondents were in their last two years at Ohio State. 76% reported conducting summer research in a lab; 92% indicated that the emails they received from the URO were helpful; the survey results confirm that email is the main source of information for SURI students. 73% indicated that they checked the website at least once during the summer. 98% said they would recommend SURI to other students. As one student summarized: “Overall, a very helpful and enjoyable experience.”
PUBLICITY AND MARKETING

GOALS
As a campus-wide office, we strive to make our services known to all of the Ohio State community. We use a variety of digital and print, passive and active methods to stay in touch with students, depending upon the target audience and the type of announcement. From the Office of Admissions, students begin hearing about undergraduate research while they are still in high school, and we aim to serve their needs throughout their undergraduate years. Likewise, we strive to reach new and established faculty members who may be interested in serving as research mentors, as well as administrators who can collaborate with us to promote undergraduate research. We constantly seek new strategies for making our services available to a larger portion of the Ohio State community, including regional campuses. Our main venues for publicity and marketing are described below.

DIGITAL COMMUNICATION

URO website
<http://undergraduateresearch.osu.edu>

The URO website serves as a comprehensive, centralized, one-stop location for finding out about undergraduate research in general and more specifically about opportunities for Ohio State students. There were more than 53,500 “hits” on our website in 2012 and nearly 40,000 unique visits, as compared to 31,400 unique visits in 2011.

The website is updated frequently to provide students at all stages of research involvement with resources and information. The more we learn about the undergraduate research population at Ohio State, the more we are able to modify and add to the website to meet their needs. Original information on the website covered introductory topics, such as what research is and how to find research opportunities at Ohio State. New sections have been added to facilitate specific tasks such as producing a research poster, writing a research proposal, and completing a research thesis. We have added pages to feature new services, such as the Peer Research Contacts and the online form to help faculty members recruit student researchers. Other pages serve to publicize the accomplishments of student researchers, provide a link to facilitate donations, and link to JUROS, the journal of undergraduate research. Efforts to make the website more user-friendly are constantly considered and implemented when possible. Our ability to update information within our own website has been central to the success of the office.

We are pleased that many OSU offices, departments, colleges, and regional campuses now have webpages dedicated to undergraduate research, with links to the URO website. A few examples (out of many) are listed below:

http://www.osu.edu/ (tab for Research)
http://www.mansfield.ohio-state.edu/HTML/research/
http://library.osu.edu/help/research-strategies/undergraduate-research/
http://honors-scholars.osu.edu/current/research.aspx
http://artsandsciences.osu.edu/students/undergrad-research (Arts and Sciences)
http://engineering.osu.edu/undergraduate/research (Engineering)
http://cfaes.osu.edu/students/academics/undergraduate/research (Food, Agr., and Env. Sci.)
http://www.cob.ohio-state.edu/undergraduate/academics/research/ (Business)
http://www.pharmacy.ohio-state.edu/research/res_ugrad.cfm (Pharmacy)
http://nursing.osu.edu/sections/research/undergraduate-research.html (Nursing)
**Undergraduate Research Office Email Updates**

More than 6,700 students have joined this list to receive weekly E-news, announcements about URO programs, related events, and research opportunities. Faculty members, staff, and academic advisors have also joined. Students can sign up at outreach events such as the Student Involvement Fair and URO-sponsored programs, or through our website. An “unsubscribe” option is offered with each outgoing message.

Email is our primary method for recruiting students to our events. As part of our evaluation of URO events, we ask attendees where they heard about the event; data from the past year showed that 69% heard through email, similar to 2011 (Table 7; pooled data from 789 student replies).

**Table 7. Sources of information for event attendance**

<table>
<thead>
<tr>
<th>Source</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail</td>
<td>69%</td>
<td>69%</td>
</tr>
<tr>
<td>Handout</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Website</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>Friend</td>
<td>6%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Advisor</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Likewise, 92% of SURI participants indicated that they found the emails helpful. One respondent summed it up as follows:

*I love weekly emails that list everything I need to know.*

**Targeted Emails**

We use the university’s emailer system provided by the Office of the Chief Information Officer to send emails to students based on college or department affiliation, class rank, Honors & Scholars affiliation, etc. This system allows us to inform targeted subsets of the student population about specific research opportunities, such as voluntary and paid internships with Ohio State faculty. In 2012, we received 75 faculty requests for assistance in finding student researchers. Many of those were repeat users of this method for recruiting undergraduate student researchers, and feedback from faculty who use this service continues to be extremely positive.

*The URO listserv has worked so well in the last few years that I would like to post a message again this year.*

*Thank you again for all your help. You have been a godsend in obtaining student help. It used to be soooooooooo cumbersome.*

*BTW, the students ... I selected have been doing very well. Thank you very much for helping me to gather this excellent undergrad group.*
Facebook, Google Calendar and Twitter
We currently post all of our events to our Facebook page, and post status updates to remind students about upcoming events. A second Facebook page was created specifically for SURI participants’ use over the summer semester. A Tumblr blog was also created in summer 2012 for the SURI program (search “Undergraduate Research Office”). In summer 2011 the office began to use Twitter (@OSU_URO). Our Twitter followers frequently retweet our updates.

Social media complement and reinforce email and website communications offered by the URO, and provide a preferred option for some students. Tweets about students participating in the research exchange in São Paulo, Brazil, were retweeted by multiple Twitter users. In-depth blog posts pertaining to many facets of undergraduate research and the SURI events were posted online and links were included in the weekly SURI e-mails. Social media usage increases URO visibility at Ohio State and elsewhere. It is an expected feature of any academic office in today’s digitally connected university environment.

Quarterly/Semester Updates to the Faculty
At the start of each quarter or semester, the URO Director sends an email newsletter to all Ohio State faculty, via their deans and department chairs, listing recent developments and programs that will be offered by URO. This allows faculty to inform students in their courses about pertinent application deadlines, information sessions, and resources on the URO website.

Academic Advising Association of Ohio State (ACADAOS)
This professional development group for advisors has a listserv that we utilize. Event evaluations showed that 3% of students reported that they heard about the particular event through their academic advisers, most of whom are not faculty members.

Honors & Scholars Net and Undergraduate E-Newsletter from Arts & Sciences
We post events and opportunities to reach all enrolled Honors & Scholars and Arts & Sciences students on a regular basis.

Office of Diversity and Inclusion
We forward all announcements to minority students on campus through the Office of Diversity and Inclusion.

First Year Experience (FYE)
This office advertises our events to first year students as appropriate.

BNN (Buckeye Net News)
This weekly newsletter goes out to the entire Ohio State student population. We use it for general announcements.

OSU Today
We frequently announce events and application deadlines on the university’s daily email, which is sent to Ohio State faculty and staff.

Ohio State Website Splash Page
This website reaches the Ohio State community and beyond. Our large events are frequently announced on this site. We have worked with staff from the University Communications and University Relations Offices on stories featuring student research projects from the Denman Forum,
with links to the URO website. Undergraduate researchers are often featured in stories about summer experiences and outstanding graduating seniors.

**Digital Bulletin Boards**
In 2012 we began using digital bulletin boards at the Ohio Union and the University Libraries to advertise services and events. The bulletin boards display images for about 20 seconds each, allowing us to email virtual posters to these sites instead of printing and hanging them, saving printing and labor costs.

**PRINTED MATERIALS**

**URO Brochure**
We print a short brochure on undergraduate research to distribute at events. Copies are also mailed to applicants to Ohio State by the Office of Admissions.

**URO Poster**
We post a large green poster entitled “Why Research?” all over campus, to encourage students to learn more about opportunities at Ohio State. We also deliver copies of this poster to advising offices on the Columbus and the regional campuses.

**Booklet: Highlights of Undergraduate Research at Ohio State**
Each year we publish a booklet of nontechnical research summaries featuring the work of 16–20 students selected from those who presented their research at the most recent Denman Undergraduate Research Forum. This popular booklet serves as a general introduction to the exciting work that our students are doing as independent researchers. The booklet is distributed to academic leaders and advisors at Ohio State, is given out to students as appropriate, and is posted to our website. This booklet is also distributed to undergraduate research offices at CIC and other peer universities.

**Journal of Undergraduate Research at Ohio State**
See p. 21 for a full description of JUROS’ activities in 2012.

**Fliers**
We post program schedules, general information about getting involved in research, and flyers for special events all over campus at least once each term.

**Denman Forum Posters and Signage**
URO manages the printing and posting of Denman Forum advertisements in campus buildings and on CABS buses in collaboration with the Honors & Scholars Center.

**The Lantern**
We announce the Distinguished Undergraduate Research Mentor and Outstanding Research Mentor awards in an annual spring advertisement in The Lantern.

**Fall Undergraduate Research Forum Abstract Booklet**
These abstracts are printed in an attractive booklet that is distributed at the forum, posted on our website, and mailed to key academic leaders.
Professional Presentations and Publications


Allison Snow serves as an elected Councilor of the Council on Undergraduate Research and attended the Annual Business Meeting in 2012.
The Journal of Undergraduate Research at The Ohio State University (JUROS)

juros.osu.edu

2011-2012 Editor-in-Chief: Jennifer Kmetich
2012-2013 Co-Editors-in-Chief: Rashmi Borah, Alexander J. Tranovich

JUROS Editorial Board & Staff
Alexander J. Tranovich Head of Graphics and Photography
Jordan Fulk Head of Marketing and Advertising
Anjella Manoharan Assistant Editor-in-Chief
Kara R. Mattioli Assistant Editor-in-Chief
Jennifer Kmetich Mentor

Faculty Editorial Board
Allison Snow Evolution, Ecology, and Organismal Biology
Robert Cook Anthropology
Lane Wallace Pharmacy
Dawn Delfin Biomedical Sciences
Ozeas Costa Earth Sciences (Mansfield Campus)

2012 SUMMARY

JUROS is a student-run Journal of Undergraduate Research at Ohio State that is open to publication from all undergraduate students in all academic disciplines. JUROS has both an online journal and a printed journal, which is distributed once per academic year. Prospective authors have the opportunity to work with trained student manuscript editors to submit and edit their work before it undergoes a double-blind peer review process. Through extensive collaboration with University Libraries, JUROS has been able to utilize an open source digital publication system, through which authors may submit manuscripts and reviewers can retrieve and resubmit reviewed articles. JUROS also publishes feature articles, videos, and podcasts.

In November 2012, JUROS published JUROS: Oculus Award Edition 2012-2013, a print version of the online journal whose purpose was to showcase the journal's progress as well as the best undergraduate manuscripts submitted. The printed manuscripts and feature articles were chosen through an extensive selection process that demonstrated excellent quality of research and the best ability to communicate the results with the audience. All Oculus award-winners from current and previous publication cycles can be viewed online at juros.osu.edu.

MAJOR MILESTONES IN 2012

The JUROS Editorial Board, in conjunction with the Undergraduate Research Office and Ohio State Libraries Knowledge Bank, was able to review, format, and publish JUROS: Oculus Award Edition 2012-2013. We distributed 300 copies. The Oculus Award Edition for Fall 2012-Spring 2013 includes 8 feature articles:

- The Higgs Boson
  By Jonathan Timcheck, Department of Physics
How Far Did Wii Run? Nintendo’s Wii Fit Overestimates Distance
*By Shayna Moratt, Department of Exercise Science*

Race-related Stress and its Correlations with Preterm Births, Rapid Births, and Low Birth Weights
*By Ronae’ McLin, Department of Anthropology*

Surveying the ALS Population of Columbus and Dayton Over Their Thoughts of the Possible Placement of a Comprehensive ALS
*By Madison McClain, Department of Biology*

The Effects of Lycosoid Spider Density within Trophic Cascades
*By Diana Saintignon, School of Environment and Natural Resources*

Self-Concept in Muslim Adolescent Girls: Hijab and the School Experience
*By Eman Tiba, Department of Psychology*

Body Perception: Parents Poorly Perceive Children’s Fitness Characteristics
*By Elan Lieber, Department of Exercise Science*

A Community of Me: The Role of Participation Allocation in Determining the Effectiveness of Consumer Empowerment Strategies
*By Zachary M. Friedman, Department of Marketing*

The beginning of the 2011–2012 academic year marked the reinstitution of the JUROS Editorial Board. Spring and Summer was devoted to improving the JUROS editorial process and increasing participation. A special focus was placed on ensuring that all staff members were completing their assignments and supported by the Editorial Board.

A manuscript editing packet was designed by the Editorial Board and used for every manuscript that was submitted to JUROS. The packet contained a checklist to gauge quality of the manuscript, as well as submission evaluation forms. This ensured that the editing process was consistent.

A training program for manuscript editing training process was formulated and executed to train manuscript editors. The training process included the adoption of a centrally accessible Google Drive account. A detailed protocol was developed for manuscript editing, contacting authors, and retrieving articles. The packet is accessible to prospective authors, so that they may know how their manuscripts will be evaluated. This new editing process is the most prominent change within JUROS this academic year.

In addition, *JUROS: Oculus Award Winners’ Edition 2012-2013* was published and distributed in November 2012. To promote and celebrate the accomplishments of the JUROS staff and published authors, the first Author Recognition and Colloquium Event was held on November 9 in the Mortar Board Room of Thompson Library. We were fortunate to have Dr. Allison Snow, Director of the Undergraduate Research Office and JUROS advisor, and Dr. Wayne Carlson, Vice Provost for Undergraduate Studies, serve as keynote speakers at the event. Published authors were invited to
speak about their research projects and their experiences with completing a research project. All authors were recognized at the end of the ceremony, which concluded with a reception.

A special thanks from the JUROS Editorial Board goes to all undergraduate authors, the staff members of JUROS, the advisors who have guided the research, the staff at the Undergraduate Research Office (including Dr. Allison Snow, Helene Cweren, and Mara Penrose), to the University Libraries (including Melanie Schlosser and Laura Seeger), and to our audience, composed of faculty, staff, and students at Ohio State.
Development Funds

CAMPUSS CAMPAIGN FUNDS

The Office of Undergraduate Research Fund (Fund 312045; $6,000 in 2012)
Proceeds from this fund support grants and fellowships for students. University employees can request tax-deductible monthly paycheck contributions be made to URO Research Fund via the Campus Campaign for giving (campuscampaign.osu.edu). One-time contributions can also be made directly via https://www.giveto.osu.edu/igive.

ENDOWED FUNDS

Karen A. Holbrook Fund (Fund 663339—current value of $202,817)
This endowment was established to honor Ohio State past-president Karen A. Holbrook. The funds are used to support research through the Undergraduate Research Office and the Study Abroad Scholarships through the Office of International Affairs (OIA). Contributions can be made to this fund via: https://www.giveto.osu.edu/igive.

The current earnings from this endowment are sufficient to support 1–2 summer research fellows each summer for $3,500 each. URO and OIA collaborate to fund students who are conducting research projects abroad each summer. Two awards were given in 2012:

**Jacob Bogart**
- Majors: Globalization Studies, French
- Research Project: Help or Detriment? The Role of Non-Governmental Organizations in Haiti
- Advisor: Terri Teal Bucci (Education and Human Ecology)

**Carey Utz**
- Majors: International Relations, French
- Research Project: Plight of Smallholder Cocoa Farmers in Ghana: A Field Study
- Advisor: Robert Agunga (Agricultural Communication, Education, and Leadership)
**SOLAR Foundation Research Fund (Fund 666787-current value of $75,551)**
The SOLAR Foundation Research Fund was established in 2009 by the Ohio State Board of Trustees with gifts from Dr. Emil Bisaccia (B.S. 1974 Biology) of the SOLAR Foundation of Morristown, New Jersey.

This endowed fund is used to support undergraduate students pursuing research in the fields of epidemiology, virology, HIV and AIDS education, other infections of the blood, and related subjects, and is administered by the Undergraduate Research Office. The 2012–13 student recipients of the SOLAR Foundation Research Grants ($1,000), their project titles, and their faculty mentors are:

**Rachel Billock (Microbiology)**  
Project Title: Identification of the Mechanism of Novel HIV-1 Inhibitors  
Advisor: Dr. Jesse Kwiek, Microbiology

**Nandan Gokhale (Microbiology)**  
Project Title: Age Dependent Differences in the Phagocytosis of Mycobacterium Tuberculosis by Murine Macrophages  
Advisor: Dr. Joanne Turner, Microbial Infection and Immunity

**Michael Nieger (Biomedical Science)**  
Project Title: Mechanisms of Biofilm Formation in Human Typhoid Carriers  
Advisor: Dr. John Gunn, Microbial Infection and Immunity

**Elizabeth Butler (Biomedical Science)**  
Project Title: Discovery of Small Molecule Inhibitors of Kinases in *Plasmodium falciparum*  
Project Advisor: Dr. Mark Drew, Microbial Infection and Immunity
The Dave V. Perry and Isabel H. Perry Research Scholarship Fund (Fund 291430–current value of $6,687.84)
The David V. Perry and Isabel H. Perry Research Scholarship Fund was established April 8, 1994 by the Board of Trustees of the Ohio State University with gifts to The Ohio State University Development Fund from Isabel H. Perry, (B.S. Biological Sciences ’43), of Toledo, Ohio, in memory of her husband, David V. Perry (B.S. Bus. Adm. ’42). The 2012-2013 Recipients of the Perry Award ($500), their project titles, and their faculty mentors are:

**Brian Hurwitz (Biomedical Science)**
Project Title: Oncolytic HSV-1 Mediated Regulation of the Host Hypoxia Response
Advisor: Dr. Balveen Kaur, Department of Neurological Surgery

**Jacob Koopman (Microbiology)**
Project Title: Identification of Salmonella Enterica Small Molecule Biofilm Inhibitors and their Bacterial Targets
Advisor: Dr. Michael Caligiuri, Department of Internal Medicine

**John Nemer (Microbiology)**
Project Title: Exploring Aberrant DNA Methylation in PTD+ Acute Myeloid Leukemia
Advisor: Dr. Jianrong Li, Dept. of Food Science and Technology

**Rhiannon Marcello (Nursing)**
Project Title: Role of Pet Dogs in Colonization with Staphylococcus aureus and Methicillin-resistant Staphylococcus aureus
Project Advisor: Dr. Timothy Landers, College of Nursing

**Amin Osman (Molecular Genetics)**
Project Title: Determining a Role for Streptococcus pneumoniae Glycosidases in Hemolytic Uremic Syndrome
Project Advisor: Dr. Samantha King, Department of Pediatrics

**Blansh del Portal (Food Science and Technology)**
Project Title: Effectiveness of Two Non-thermal Processing Technologies on the Inactivation of Internalized Norovirus GII.4 and animal Caliciviruses in Romaine Lettuce
Project Advisor: Dr. Jianrong Li, Department of Food Science and Technology
Appendix A
Undergraduate Research Offices at Benchmark & CIC Universities

Most large public research-intensive universities encourage participation in undergraduate research through an office, a website, a symposium or forum, or specific, funded programs. Many universities utilize more than one of these options. In this section, we compare programs among our benchmark and fellow CIC universities.

The trend toward having a central office that serves as an informational clearinghouse for the entire student population, the model adopted at Ohio State in 2006, is becoming more common nationally. A comparison of programs at our benchmarks and the CIC universities shows that 12 of 15 have a central, university-wide office, and all have a university-wide forum or symposium to celebrate and showcase undergraduate research accomplishments (Table A1). It is clear to us that offering a university-wide forum for undergraduate research is essential to maintaining our standing as a leading research institution.

BENCHMARK UNIVERSITIES

1. Pennsylvania State University  http://undergradresearch.psu.edu/
Penn State has a website and an undergraduate research forum. On their website, they advertise summer grants, conference travel grants, and the forum. The website also includes a database of faculty postings for undergraduate research opportunities which can be sorted by college or faculty.

2. The University of Arizona  http://ur.arizona.edu
The University of Arizona has 23 undergraduate research programs through the College of Science. They have a searchable database of faculty. The university has research poster sessions in various STEM disciplines, including the Undergraduate Biology Research Program and the NASA Space Grant Internship program, which have been in existence for 20 years. They also have awards, including Outstanding Seniors, Galileo Scholars and Excellence in Undergraduate Research.

3. The University of California at Los Angeles  www.ugeducation.ucla.edu/ugresearch/
www.gdnet.ucla.edu/asis/srp/srpinfo.htm
UCLA has Research Centers for undergraduate research in Life & Physical Sciences and in Humanities & Social Sciences. Research Center websites include lists of fellowship and scholarship opportunities, student profiles, and announcements about workshops for getting started in research. UCLA also has a forum for students in Physical and Life Sciences and the UCLA Undergraduate Science Journal.

4. The University of Florida  http://www.honors.ufl.edu/research.aspx ;
http://www.clas.ufl.edu/jur/
The University of Florida offers a database of all research opportunities by field and programs for 1st and 2nd year students to begin research. Undergraduate research is coordinated through the Honors Program, where students can receive credit and financial aid for research. Florida also has a University Scholars Program for non-Honors students. Students can publish in a campus-wide Journal of Undergraduate Research.
5. **The University of Illinois at Urbana-Champaign**
The University of Illinois at Urbana-Champaign formed the Office of Undergraduate Research in 2012 but does not yet have a website. Their plans are to promote and expand research opportunities, integrate research into the curriculum, and offer awards and travel subsidies for student researchers. The school sponsors an annual research symposium for undergraduates.

6. **The University of Maryland** [http://ugresearch.umd.edu](http://ugresearch.umd.edu)
The University of Maryland has an office devoted to undergraduate research which offers seminars about applying to the NSF Graduate Research Fellowship, applying to graduate school, presenting at conferences, etc., with an online database listing research opportunities. The Maryland Summer Scholars program offers summer research funding. Maryland has an annual Undergraduate Research Day for presenting research.

7. **The University of Michigan** [http://www.lsa.umich.edu/urop/](http://www.lsa.umich.edu/urop/)
The University of Michigan has a program for 1st and 2nd year students with a website, staff, alumni organization, a large, multi-session spring symposium to showcase student research accomplishments, and several externally-funded summer programs. Michigan obtained NSF funding to establish and evaluate this highly effective, nationally known program. After the grant expired, the university has continued its support for this program with more than 1200 students and 700 faculty research mentors. Michigan does not yet have a campus-wide program that focuses on 3rd and 4th year students.

The University of Minnesota has a central office that is open to all undergraduates. Undergraduate Research Scholarships are granted through the admissions office, and current undergraduates may apply and be funded to do research through the Undergraduate Research Opportunities Program. There are campus-wide symposiums in the spring and summer.

The University of Washington has an Undergraduate Research Program with a campus-wide office that helps students find research opportunities and sponsors an annual symposium. The core program is centrally funded and collaborates closely with the a large endowment that provides competitive scholarships; external and gift funds provide support for special programs including summer research. Their website includes a database of research opportunities, including programs for paid research experiences.

10. **The University of Wisconsin-Madison** [http://www.provost.wisc.edu/undergradresearch.htm](http://www.provost.wisc.edu/undergradresearch.htm)
The University of Wisconsin-Madison supports an Undergraduate Research Scholars Program open to 1st and 2nd year. There are numerous other content or discipline specific undergraduate research opportunities offered including a McNair Scholars Program and the Wisconsin Idea Fellowship. The university sponsors an Undergraduate Symposium for students in all disciplines, with several hundred participants.

**CIC INSTITUTIONS**

Indiana University has the Cox Research Scholars Program which selects up to 40 incoming freshmen each year. Recipients of this scholarship commit to year-long research or creative projects, renewable for up to four years. The scholarship has a total value of more than $60,000 over four
years. Other undergraduate research initiatives include the McNair Program for underrepresented groups, the Science Technology and Research Scholars Program, and the Intensive Freshman Learning Experience, which involves six weeks of laboratory research during the summer between high school and college, accelerated freshman science courses, and a $1,000 scholarship. Indiana also has a state-wide undergraduate research conference.

12. **Michigan State University** [http://admissions.msu.edu/academics/research.asp](http://admissions.msu.edu/academics/research.asp)

Michigan State University’s organization is similar to that of Ohio State, with a central office, personnel, a website, a large annual forum, and a university-wide approach. Most funding for student researchers is distributed by other units on campus, and small, discipline-specific programs are offered by various colleges and departments.

13. **Purdue University** [http://www.admissions.purdue.edu/academics/research.php](http://www.admissions.purdue.edu/academics/research.php)

Purdue does not appear to have campus-wide research programs for undergraduates. Individual departments have websites for undergraduate research. The University also has a program called Discovery Undergraduate Research Internship, where students can apply for part-time internships during the academic year and full-time internships during the summer to conduct research in any STEM field.

14. **University of Iowa** [http://www.uiowa.edu/~icru/](http://www.uiowa.edu/~icru/)

The Iowa Center for Research by Undergraduates at the University of Iowa promotes undergraduate involvement in mentored research and creative projects across all disciplines of study. Their website offers information on programs to support undergraduate research including funding and presentation opportunities. There are numerous research conferences and symposiums for undergraduate research each year.

15. **The University of Nebraska** [http://www.unl.edu/ucare/](http://www.unl.edu/ucare/)

The University of Nebraska has summer research programs in various disciplines and sponsors an annual research fair. The University also has the Undergraduate Creative Activities and Research Experiences Program, a two-year program for students in any field. Students are funded and receive course credit to assist in a mentor’s project during their first year and conduct their own project in the second year. Students are required to present their work at the end of the second year.
### Table A1. Comparison of undergraduate research offices at Benchmark and CIC Universities

<table>
<thead>
<tr>
<th>Institution</th>
<th>Central undergraduate research office</th>
<th>University-wide forum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana University—Bloomington</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Michigan State University</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Ohio State University</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pennsylvania State University¹</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Purdue University</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>University of Arizona¹</td>
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<td>Yes</td>
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<tr>
<td>University of California, Los Angeles¹</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>University of Florida¹</td>
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<td>Yes</td>
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<td>University of Illinois, Champaign-Urbana¹</td>
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<td>University of Iowa</td>
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<tr>
<td>University of Washington¹</td>
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<td>Yes</td>
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<tr>
<td>University of Wisconsin—Madison¹</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1. Ohio State’s benchmark universities as designated by the Office of Academic Affairs.
Appendix B

URO Summer Research Fellows

The URO provides fellowships for undergraduate students who pursue full-time research during Summer Term under the supervision of an Ohio State faculty member. In 2012, 30 students received fellowships, including 13 funded by the URO, two students supported through the Holbrook Fund for International Research, two funded by the Department of Evolution, Ecology, and Organismal Biology, and thirteen students funded by the Department of Psychology. Each fellow received a $2,800 stipend for 8 weeks of research, which was shorter than in past years due to the switch from quarters to semesters, and participated in the URO’s Summer Undergraduate Research Institute. The fellows presented their findings at the annual Fall Research Poster Forum.

We thank the Office of Undergraduate Education, the Office of Research, the Department of Psychology, the Department of Evolution, Ecology, and Organismal Biology, and donors to the Karen A. Holbrook Fund and URO’s Campus Campaign Fund for supporting this program. Thanks are also due to the staff in the Office of Student Financial Aid, especially Brad Roll, for help with disbursing funds to these and other award winners.

COMMENTS FROM 2012 FELLOWS

The responses from our 2012 Fellows, like those from previous years, have been overwhelmingly positive. This year’s fellows emphasized the benefits of complete immersion in their projects and the preparation to adapt to the unexpected nature of research. Below, we provide selected quotes from students to represent the general consensus about the program. As one fellow summed his experience up:

Through this project, I have learned valuable lessons, acquired a sizeable amount of theoretical knowledge and gained tremendous experimental research and laboratory experience that will stand as assets wherever I choose to be in the future.
Sai Pranav R. Uppati, Chemical Engineering

Many students learned how to deal with unexpected events, results and setbacks:

When an idea fails to blossom into meaningful research, we are still left with interesting questions that could become research.
Nicholas Deis, Economics

What I’ll take away from this experience is that research, like most things in life, is a process. It’s impossible to control everything and there will always be something unexpected that pops up.
Amber Torelli, Linguistics and Spanish

One of the most important skills in lab is how to deal with failure. I learned to rebound from failures and setbacks and push through the hard times as any great researcher has had to do...
Mary Stone, Biology
Ultimately, I learned how to effectively “problem solve” while coping with and battling through unexpected adversity.
Sarah Ann Swager, Biomedical Science

An important insight was that research takes time, and many students appreciated the opportunity to work full-time on their projects:
There is no way I could have accomplished this without the URO summer fellowship. The sheer time involved well exceeded 40 hours per week.
John Entingh, Psychology

Another valuable thing I learned from this summer experience is I gained a better understanding of what a career in research would be like. Never before had I dedicated forty hours or more a week to research.
David Weiner, Psychology

The ability to work full time on my research has allowed me to make very substantial progress on my Honors thesis project.
Thomas O’Connell, Psychology

Five fellows had the opportunity to travel as part of their summer research and found it to be very enriching:
I was extremely happy to find all of this new information in the LBJ Archive. I wouldn’t have been able to go to Austin [Texas] without all of the grants and scholarships that I got.
Ross Butters, Political Science and History

As an undergrad, I never expected to have the abilities or the opportunity to travel abroad to complete my own research project. I have learned so much along the way, including basic research practices, logistics of conducting research abroad, and the steps to completing an independent project.
Shelby Kretz, Psychology

Research also affirmed students’ career goals and prepared them for the future:
Ultimately, I would like to become the principal investigator of my own laboratory. As much as I enjoy working at the lab bench, I would eventually like to lead a team of researchers to answer my own questions about oncolytic virus therapies, analyze my lab’s results, figure out how it fits in with previous research, and propose my own ideas to the scientific community.
Nicholas Denton, Biomedical Science

The single most important thing I have learned this summer is what graduate school will be like. This experience has shown me firsthand what a long and arduous process conducting your own research can be, and I am thankful to be going into a graduate program with this knowledge, as opposed to being naive and unprepared.
Joseph Doherty, Psychology

This fellowship...has allowed me to challenge myself, gain more experience, and learn more about myself as a researcher.
Anjni Patel, Psychology
2012 URO SUMMER FELLOWS

Ross Butters
Majors: Political Science, History
Research Project: The Secret to Secret Senate Holds: Historical Analysis and Quantification of the Impact of Holds
Advisor: Janet Steffensmeier (Political Science)

Nicholas Deis
Major: Economics
Research Project: Information Compression in Hierarchies
Advisor: Karen Bernhardt-Walther (Economics)

Zhen Deng
Major: Exercise Science
Research Project: Effects of Calorie Restriction and Intermittent Fating on Traumatic Brain Injury-Induced Microglia
Advisor: Jonathan Godbout (Neuroscience)

Nick Denton
Major: Biomedical Science
Research Project: Investigation of Acid Sphingomyelinase Contribution to Ezrin Activation and Hindered Tumor Motility in Glioblastoma Multiform
Advisor: Balveen Kaur (Neurological Surgery)

Rebekah Kartal
Majors: International Studies, Spanish
Research Project: On the Conditions of the Possibility for Transcending the Capitalist Nation State in Chiapas, Mexico: a Karatanian Analysis
Advisor: Joel Wainwright (Geography)
2012 URO SUMMER FELLOWS, CONTINUED

Jonathan Lampley  
Major: Jazz Studies  
Research Project: Fight the Team: The Necessity of Independent Production in the Music Industry  
Advisor: Mark Rubinstein (Music)

Achal Singhal  
Major: Aerospace Engineering  
Research Project: Drag Reduction Using Nanosecond Pulse Driven DBD Plasma Actuators in Advanced Rotocraft  
Advisor: Mohammad Samimy (Mechanical and Aerospace Engineering)

Sarah Swager  
Major: Biomedical Science  
Research Project: Claudin 5 Knockout in Cardiac Tissue  
Advisor: Jill Rafael-Fortney (Molecular and Cellular Biochemistry)

Maria Talarico  
Major: Biomedical Engineering  
Research Project: Relationship Between Postural Control and Trunk Stability  
Advisor: James Onate (Allied Medical Professions)

Amber Torelli  
Majors: Linguistics, Spanish  
Research Project: Perceptual Dialectology Within Ohio  
Advisor: Kathryn Campbell-Kibler (Linguistics)
2012 URO SUMMER FELLOWS, CONTINUED

**Sai Pranav Uppati**  
Major: Chemical Engineering  
Advisor: Umit Ozkan (Chemical and Biomedical Engineering)

**Alexandra Wells**  
Major: Nutrition  
Research Project: The Effects of Retinoids on the Activation of Peroxisome Proliferator-Activated Receptor Coactivator 1a (PCG1a) as it Relates to Obesity  
Advisor: Ouliana Ziouzenkova (Human Nutrition)

**Jay Young**  
Major: Biomedical Engineering  
Research Project: Effects of Functional Movements on Cartilage Health in NCAA Football Linemen  
Advisor: Robert Siston (Mechanical and Aerospace Engineering)

2012 HOLBROOK FELLOWS IN INTERNATIONAL RESEARCH

**Jacob Bogart**  
Majors: Globalization Studies, French  
Research Project: Help or Detriment? The Role of Non-Governmental Organizations in Haiti  
Advisor: Terri Teal Bucci (Education and Human Ecology)

**Carey Utz**  
Majors: International Relations, French  
Research Project: Plight of Smallholder Cocoa Farmers in Ghana: A Field Study  
Advisor: Robert Agungu (Agricultural Communication, Education, and Leadership)
Travis Billingsley  
Major: Psychology, Criminology  
Research Project: Construal Levels and Self-Control in Relation to Honesty  
Advisor: Kentaro Fujita (Psychology)

Qijia Chen  
Majors: Psychology  
Research Project: The Influence of Emotional States on Anchoring Effects  
Advisor: Ellen Peters (Psychology)

Joseph Doherty  
Major: Psychology  
Research Project: Increasing Mental Health Service Use in Primary Care: A Moderating Effect of Age  
Advisor: Jennifer Cheavens (Psychology)

John Entingh  
Major: Psychology  
Research Project: The Shopper’s Dilemma  
Advisor: Kentaro Fujita (Psychology)

Matthew Fullwiler  
Major: Psychology  
Research Project: Worry Now, Pay Later  
Advisor: Julian Thayer (Psychology)
Chad Gossett
Major: Psychology
Research Project: Testing the Context Prediction Model: Can Familiar Contexts Support New Memory Formation?
Advisor: Per Sederberg (Psychology)

Shelby Kretz
Major: Psychology
Research Project: Cognitive Vulnerability and Immigrant Stress: A Test of the Diathesis Stress Model in Immigrants in Spain
Advisor: Daniel Strunk (Psychology)

Thomas O'Connell
Major: Psychology
Research Project: Using fMRI Repetition Attenuation to Uncover the Neural Representation of Natural Scenes
Advisor: Dirk Bernhardt-Walther (Psychology)

Anjni Patel
Major: Psychology
Research Project: To Forgive is Divine: Women’s Cardiovascular Health and Forgiveness of Negative Emotions
Advisor: Julian Thayer (Psychology)

Jonathan Pentz
Major: Psychology
Research Project: Attitudinal Effects on Numerical Anchoring: Proposal to Develop a Mere Exposure Paradigm to Manipulate Attitudes in Future Anchoring Experiments
Advisor: Duane Wegener (Psychology)
2012 URO PSYCHOLOGY SUMMER FELLOWS, CONTINUED

**Joseph Pochiro**
Major: Psychology
Advisor: Derick Lindquist (Psychology)

**Emily Weichart**
Majors: Psychology, English
Research Project: Tracking Performance at the Crossroads of Perception and Memory
Advisor: Ellen Peters (Psychology)

**David Weiner**
Major: Psychology
Research Project: The Effects of Numeracy and Brand Preference on the Left Digit Effect
Advisor: Ellen Peters (Psychology)

2012 EVOLUTION, ECOLOGY, AND ORGANISMAL BIOLOGY URO FELLOWS

**Andrew Muehleisen**
Major: Evolution and Ecology
Research Project: Incidence of Extra Floral Nectaries and Their Impact on the Growth and Survival of Lowland Tropical Rainforest Trees
Advisor: Simon Queenborough (Evolution, Ecology & Organismal Biology)

**Mary Stone**
Major: Biology
Research Project: Role of Pigment Dispersing Factor in Mosquito Overwintering Diapause Response
Advisor: David L. Denlinger (Entomology)
PAST RECIPIENTS OF SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS:

**SUMMER 2011:**
Emily Cason—Biomedical Science
Christine Castillo—Exercise Science
Rui Cao—Actuarial Science, Psychology*
Joseph Doherty—Psychology*
David Garman—Psychology, International Business
Megan French—Psychology *
Dustin Homan—Agricultural and Extension Education
Derek Howell—Animal Sciences
Jonte Jones—Psychology*
Grant Joslin—Anthropology, Mathematics
Seva Khambadkone—Molecular Neuroscience
Kyle Olson—Anthropology, Near Eastern Languages and Cultures
Kimberly Rolley—Psychology, Neuroscience*
Katie Sasso—Psychology
Jacob Sawmiller—Biology*
Kristin Schafer—Biology *
Nicholas Shaffer—Psychology
Rachel Soltys—Animal Sciences
Samuel Stuard—Engineering Physics
Joshua Vidmar—Geography
Alexis Wagner—Psychology*
Rachel Weiskittle—Psychology*
Zheng Ye—Economics, Mathematics
Xuyan Zhao—Communication

**SUMMER 2010**
Alisa Baron—Spanish
Ashley Bartman—Chemistry, History of Art
Shirley Li—Physics
Elan Leiber—Exercise Science
Lily Liu—Biomedical Science
Nathan McCullough—Sociology, Strategic Communications
Robert Nichols—Psychology*
Danielle Rickert—Psychology*
Justin Schulze—International Studies (Development), Economics
Mackenzie Schumer—Neuroscience
Suzanne Tabbaa—Biomedical Engineering
Hok Hei Tam—Chemical Engineering, Mathematics
Dan White—Jazz Studies, Music Education
Justin Hanson—English
Viral Patel—Economics, Microbiology
Micah Goldfarb—Psychology*
Suzanne Van Horn—Psychology, English
SUMMER 2009:
Andrew Campbell—Biology, International Studies
Jake Connors—Physics
Brianna Dance—Fine Art, Philosophy
Kevin Gabbard—Linguistics
Ravi Gupta—Political Science, Molecular Genetics
Carla Justiniano—Molecular Genetics
Ellen Manovich—History, English
Hudson McFann—Geography
Margaret Mehling—Psychology
Jessica Modlich—Mechanical Engineering
Scott Moreland—Physics, Mathematics
Jeremiah Santos—Electrical & Computer Engineering
Surili Sheth—Political Science, Economics
Adrienne Strong—Biomedical Science, French
Gregory Webb—English
Kevin Yang—Chemical & Biomolecular Engineering, Piano Performance

SUMMER 2008:
Gina Aloisio—Biomedical Sciences, Spanish
Kevin Bowen—Accounting
Allison Buenger—Fine Arts
Jennifer Chao—Biomedical Sciences
Katherine Clonan-Roy—Spanish, Psychology
Marc Coons—Chemistry
Kevin Giriunas—Civil Engineering
John Pate—Linguistics
Teresa Pratt—Linguistics
Andrew Rigney—Political Science, History
Caroline Sim—European Studies, English, French
Diane Smith—Microbiology, Spanish
Stephen Smith—Biomedical Science

*Funded by participating departments
Appendix C: Recipients of Undergraduate Research Mentor Awards

2012 AWARDEES
The URO Student Advisory Committee selected the winners for Distinguished Undergraduate Research Mentor (for regular tenure-track faculty) for Outstanding Research Mentor (for research & clinical faculty, auxiliary faculty, postdoctoral researchers, and graduate students) from 75 nominations made by presenters at the Denman Undergraduate Research Forum. Sample quotes from student nominations are included to illustrate the value of these mentor-student collaborations.

DISTINGUISHED UNDERGRADUATE RESEARCH MENTORS:

Dr. Helen Chamberlin—Molecular Genetics
Dr. Chamberlin is dedicated to using undergraduate research as an opportunity to train a new generation of scientists. Every undergrad that enters her lab is given a project of their own. In my case, having the opportunity to perform the whole series of experiments needed to move my project forward increased my understanding of the process of scientific research.

Dr. W. Berry Lyons—Earth Sciences
When I meet with Berry, he brings up points that challenge and motivate me, and he asks questions that I often ponder for hours after leaving our meeting. It is clear that he spends time thinking about my project and wants me personally to develop as a researcher.

Dr. Kendra McSweeney—Geography
Dr. McSweeney encourages her students to cross boundaries and learn from other cultures as well as to explore threats to other societies and our own. Throughout this process, she has inspired me to continue research, to take a political role by supporting Tawahka communities through NGOs, and to apply to graduate school in the future.

Dr. Heather Powell—Materials Science
Heather is friendly and energetic, actively engages her students and takes an interest in their personal growth in and out of the laboratory. She makes herself completely available to her students whenever they need her.

Dr. Daniel Strunk—Psychology
Dan’s incredible assistance throughout my graduate school application process solidified his unique mentoring ability. I told Dan that I would be interested in continuing my graduate studies under him and he encouraged me to apply. From looking over my CV and personal statement, to discussing programs and backup options, Dan offered me invaluable advice. In total I applied to 12 programs, and received an impressive 7 interview invitations.
OUTSTANDING RESEARCH MENTORS

The Outstanding Research Mentor Award was created by the Undergraduate Research Office in 2011 to recognize clinical and research faculty, lecturers, and graduate students who have provided outstanding mentorship and guidance to undergraduate researchers at Ohio State. Designed to be a complement to the Distinguished Undergraduate Research Mentor (DURM) awards which are reserved for full-time faculty members, the ORM Award acknowledges the powerful influences that other members of the Ohio State community can have on an undergraduate’s progress, and the integral roles they play in labs and classrooms. Presenters at the Denman Undergraduate Research Forum are eligible to nominate an individual for the ORM Award and a student committee then reviews nominations and selects a winner.

Sultana Nahar—Astronomy

She was very supportive and appreciative of my work especially in our weekly meetings which as an undergraduate is very encouraging to have someone as established as she is to recognize what you are doing as valuable. It can be intimidating to work with professors especially in a research setting because you want to do a good job and feel that you are contributing to the process and to receive that confirmation is very important.

Carmen Swain—Exercise Science

I would not be the strong, confident young woman I am today without the mentorship of Dr. Carmen Swain. Many women today are expected to “do it all”—be a good mother and a “super-star” employee. Swain goes above and beyond these roles, as she is an exceptional mother of three young children, a loving wife, an outstanding teaching professor, an admirable lab advisor, a strong mentor, and a caring friend. She is the woman I aspire and hope to be.
PAST RECIPIENTS OF DISTINGUISHED UNDERGRADUATE RESEARCH MENTOR AWARDS:

2011 Awardees
Dr. Bryan Mark—Geography
Dr. Manuel Martinez—English
Dr. Donna McCarthy—Nursing
Dr. Qingua Sun—Public Health
Dr. Jessica Winter—Biomolecular and Chemical Engineering

2010 Awardees
Franco Barchiesi—African American and African Studies
Yu-Ping Chin—Earth Sciences
Harvey Graff—English and History
Becky Mansfield—Geography
Mei Zhuang—Aerospace Engineering

2009 Awardees
Janet M. Box-Steffensmeier—Political Science
David L. Denlinger—Entomology
James W. Gregory—Aerospace Engineering
Charles Massey, Jr.—Art
Narasimham L. Parinandi—Medicine

2008 Awardees
Michael Boehm—Plant Pathology
Cynthia Clopper—Linguistics
Richard Hughes—Physics
Sarah Schoppe-Sullivan—Human Development and Family Science
Richard Swenson—Biochemistry

2007 Awardees
Robert Baiocchi—Internal Medicine
Donald Dean—Biochemistry
John Grinstead—Spanish and Portuguese
Irfan Nooruddin—Political Science
Brian Winer—Physics

PAST RECIPIENTS OF OUTSTANDING RESEARCH MENTOR AWARDS:

2011 Awardees
Lisa Cravens-Brown—Psychology
Veronique Lacombe—Pharmacy Practice and Administration
Appendix D
Priorities for Donors to URO

Website link for general donations to URO:
<http://undergraduate-research.osu.edu/donate.html>

We have many opportunities for donors to help students succeed, including the suggestions below.

GRANTS AND AWARDS

- **Summer research experience** (10 weeks, full time; coordinate with colleges)
  - $5000 per student (includes $1000 for faculty mentor) × 50 students per year = $250,000 per year
  - Possible name: “(Donor’s Name) Summer Research Fellowships”

- **Research and travel grants**
  - $500 per student × 100 students per year = $50,000 per year to cover research expenses
  - $1000 per student × 10 students = $10,000 per year for travel to conduct research or present completed research at forums
  - Possible name: Do Something Great Grants

- **Introduction to research targeting first- and second-year students**
  - two tracks: library research, or internship within a research group
  - student registers for independent study and receives 3–5 credits
  - mentors (faculty, librarians, other researchers) receive $500 per student to pay expenses and serve as an incentive
  - $500 per mentor × 100 students per year = $50,000 per year
  - Possible name: “Early Research Opportunities Program”

- **Mentoring awards for graduate students**
  - $500 award (advanced Ph.D. candidates only) for supervising an undergraduate student’s research project
  - $500 × 100 per year = $50,000 per year
  - Possible name: “Graduate Student Mentor Awards from URO”

- **Mentoring awards for faculty**
  - Each year, URO will recognize five faculty members with outstanding records of sponsoring undergraduate research.
  - $1000 × five faculty members = $5,000 per year
  - Possible name: “(Donor’s Name) Award for Outstanding Undergraduate Research Mentor”

OTHER OPTIONS FOR GIVING:

1) Support the Denman Undergraduate Research Forum each spring. This forum serves as a showcase for ~600 students annually and as a huge celebration involving the entire university community. The forum presents the very best achievements of
our most creative and resourceful students. However, long-term funding from generous current donors, including key corporations and the founders, Mr. and Mrs. Richard Denman, is not guaranteed. With the Honors and Scholars Center, we are actively seeking additional support to be able to continue this tradition of excellence. Total cost: $125,000 per year.

2) **Summer Undergraduate Research Institute.** This expanded version of our current institute will provide programs and a sense of community for undergraduates doing research on campus during the summer. Funds are needed for coordination and for events. Funds for fellowships are listed above. **$25,000 per year; name after donor.**

3) **Autumn undergraduate research forum** to be held each year. Building on our current fall forum, this larger event will accommodate students who are unable to participate in the Denman Undergraduate Research Forum in Spring, especially students who did research during the summer, and will add another venue for students to present their research. Funding is needed for facility costs, refreshments, publicity, and awards. **$80,000 per year.** Possible name: *(Donor’s Name) Fall Forum for Undergraduate Research*

4) **Summer Term Humanities Institute.** Support for research collaborations between a faculty member in the humanities ($7,000) and three undergraduate students ($4,000 per student). Three groups per summer for ten weeks of collaboration ($19,000 x 3 = $57,000). **Name after donor.**

5) **URO Sponsors Group.** A group of sponsors will provide discretionary funds for building the Undergraduate Research Program, including the objectives listed above. Participating donors will contribute $4,000 or more per year per person. Possible name: **Friends of Undergraduate Research at Ohio State** Members will receive newsletters, invitations to URO events, and opportunities to meet student researchers.

6) **New staff position** for a program manager for events such as the Denman Forum and for more extensive communications and grant-writing. Estimated cost: **$65,000 per year** for salary and benefits.