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**Office of Undergraduate Research (OUR) Annual Report 2012-13**

I.

List of Accomplishments

1. With \$300,000 from Legislative Mission-Based Funding, UROP served 292 students who received 386 assistantships ( including renewals) over fall, spring and summer semesters of 2012-13. This represents the first time that we have come this close to our goal of serving 300 or more students in one year.
2. The OUR Created a data base of
  - a. All departments at the University that have undergraduate research for credit, along with the names of courses.
  - b. The total number of undergraduates doing research in all departments as well as on upper campus during the 2011-12 academic year (including summer).
3. The OUR has just completed the first year of a new living and learning community consisting of one half floor devoted to research in the Sage Point Dorm. We hosted two faculty presentations and a lab tour during the first semester. Although there were some issues that needed to be worked through, we learned from these and thanks to a new application process, look forward to a successful second year.
4. For the first time this year, the OUR, in conjunction with Marriott Library, was able to support printing of student posters for poster presentations at research events.
5. This past April, the OUR sponsored the largest U of U Undergraduate Research Symposium in its history.
6. 11 UROP alumni graduated from medical schools around the country this spring. Several UROP alumni also received other distinctions
7. The OUR is currently in the process of hiring a new full time administrative assistant to replace previous part time Administrative Assistant Andrea Haag who has taken another position.

II.

Supporting Data

1. In the summer of 2012, Associate Vice President for Budget Kathy Anderson offered \$300,000 in Mission Based Funding from the Utah State Legislature, to be spent on students in UROP, to replace the \$100,000 the OUR had been receiving for the past three years from research overhead. This new money boosted the UROP 1001 account to \$543,860. Of this money all \$300,000 plus an additional \$17,169 from other money in the OUR 1001 account was spent on UROP assistantships and supporting activities during the Fall 2012 and spring 2013 semesters as well as during the current summer 2013 semester.

**OUR Budget for Fiscal 2012-13**

1001 Account

Base Budget	\$65,000
Base Budget from soft money (from Senior VP)	15,000

Additional Base Budget (from Senior VP)	100,000
Additional soft money (from Senior VP)	50,000
Legislative Mission-Based Funding	300,000
SCH from UGS 4800	<u>13,860</u>
	\$543,860

6000 Account

Funding from the Office of Technology Ventures	\$20,000
Expendable from the Francis Family Fund	5,400
University Board of Advisors	2,000
Parent Fund	<u>1,950</u>
	29,350

**Other Contributions to the UROP Budget**

3 Students on Work Study (allows funding at ¼ the normal amount)

2. In conjunction with the chairs of all departments and programs at the University that have undergraduate majors, the OUR has created a list of a. all departments that offer research for credit and b. the number of undergraduates doing research on campus for the 2011-12 academic year.

a.

**Departments/Programs Giving Credit in the Major for Undergraduate Research**

<u>Dept./Program</u>	<u>Course</u>
Accounting	Undergraduate Research (Independent Study)
Art and Art History	Independent Study
Anthropology	Undergraduate Research (Independent Study)
Asian Studies	UGS 4800 Undergraduate Research (Independent Study)
Atmospheric Sciences	ATMOS 5900 Capstone; ATMOS 5910 Undergraduate Research
Ballet	Required Capstone; Honors Electives
Bioengineering	Required Research Project; Design Project
Biology	BIOL 4955 (required lab credit; BIOL 4995 Research Electives (for Honors students)
Chemical Engineering	Undergraduate Research (Independent Study)
Chemistry	CHEM 4800 Undergraduate Research; Advanced Labs
City and Metropolitan Planning	CMP 4950 Independent Study; CMP 4950 Internship in Planning

Communication	COMM 5999 Research Independent Study (for students engaged in faculty-supervised research)
Communication Sciences and Disorders	CSD 4800 Independent Study UG; CSD 4930 Independent Research in CSD; CSD 4999 Honors Thesis/Project
Economics	ECON 5955 Independent Study; ECON 5960 Special Topics
Electrical and Computer Engineering	ECE 4900 and 4910 Senior Thesis Series
English	ENGL 4993 Undergraduate Research
Environmental and Sustainability Program	Undergraduate Research (Independent Study – by permission as replacement for Internship)
Exercise and Sports Science	Research Experience
Finance	Honors Thesis
Film	FILM 4910 Independent Research Project; FILM 4930 Independent Research; FILM 4960 Independent Projects: Film Production
Geography	GEOG 5950 Undergraduate Research; GEOG 5940 Undergraduate Internship
Gender Studies	Research or Internship
Geology	Senior Thesis
Health, Society and Policy	Undergraduate Research (Independent Study)
History	HIST 4990 Senior Seminar
Honors College	Honors Thesis
International Studies	UGS 4800 Undergraduate Research
Languages and Literature	LANG 3910 Undergraduate Research
Latin American Studies	Undergraduate Research (Independent Study)
Linguistics	Undergraduate Research (Independent Study)
Management	Undergraduate Research (Independent Study)
Marketing	Internships and Labs
Materials Science and Engineering	Senior Design Project (required for majors)
Mathematics	MATH 4800 Research Experience for Undergraduates
Medical Laboratory Science	Clinical Elective (sometimes research, but not always)
Metallurgical Engineering	Technical Elective
Middle East Center	MID E 4960 Undergraduate Research (Independent Study)
Modern Dance	DANC 4410 Making Dances/Choreographic Research; DANC 4461 Senior Capstone II/Choreographic Research
Music	MUSC 4920 Senior Recital; MUSC 4970 Senior Project; MUSC 4910 Individual Research
Nursing	NURS 4150 Nursing Initiatives (required course leading to research)
Division of Occupational Therapy	Undergraduate Research (Independent Study)
Philosophy	Independent Research Coursework (counts for Area Requirements as well as elective credit in the major)
Physics and Astronomy	Undergraduate Research (Independent Study)
Psychology	Research Experience Classes (4000 level courses); Senior Thesis Classes; Honors Thesis
Religious Studies	Undergraduate Research (Independent Study)
Sociology	SOC 3950 Individual Research; SOC 4877 Senior Thesis
Theatre	THEA 3930 Undergraduate Research Projects; Capstone Acting and Production Classes

b.

**Total Number of Undergraduates Engaged in Research During the 2011-12 Academic Year by Department/Program**

Accounting.....	1
Anthropology.....	18
Architecture.....	7
Art and Art History.....	42
Asian Studies.....	1
Atmospheric Sciences	
Ballet.....	0
Bioengineering	
Biology.....	125
Chemical Engineering.....	40
Chemistry .....	68
City and Metropolitan Planning.....	8* (subtract 3 from UROP)
Civil Engineering.....	47
Communication.....	4*
Communication Sciences and Disorders.....	24
School of Computing.....	32
Economics.....	31
Electrical and Computer Engineering.....	91
English.....	59
Environmental and Sustainability Program.....	2
Exercise and Sports Science	
Family and Consumer Studies .....	24* ** (subtract 1 from UROP and 2 from Honors)
Film	
Finance .....	7**
Gender Studies.....	8* (subtract 2 from UROP)
Geography	
Geology and Geophysics.....	24
Health Sciences Colleges.....	171
Health, Society and Policy.....	0 (all research through other majors)
History.....	96
Honors College.....	75 (adjusted) (actual = 85)
International Studies.....	0
Languages and Literature.....	5* (subtract 3 from UROP)
Latin American Studies.....	1
Linguistics.....	10* ** (subtract 1 from UROP and 1 from Honors)
Management	
Marketing.....	0
Materials Science and Engineering.....	11
Mathematics.....	16
Medical Laboratory Science.....	3
Metallurgical Engineering.....	17
Middle East Center	
Mining Engineering.....	2

Modern Dance.....	94
Music.....	36
Nursing.....	20
Division of Occupational Therapy.....	11
Parks, Recreation and Tourism.....	100
College of Pharmacy.....	11
Philosophy.....	2
Physical Therapy.....	1
Physics and Astronomy.....	51* (subtract 38 from UROP)
Psychology.....	163
Religious Studies.....	1
Special Education.....	1
Theatre.....	63
UROP.....	175 (adjusted) (actual = 227)
Total (thus far).....	1,799

\*Subtract from UROP

\*\*Subtract from Honors

3. While the Sage Point Dorm LLC which consists of one half of a floor in the dorm, was not entirely successful this past year (low participation in research events, and a few student behavioral problems) we have greatly improved our intake process with the addition of an application form and interview process. While accepting only students who appear to evince a genuine interest in research, we have come close thus far to filling the half floor and look forward to a year of well-attended research presentations and events.
4. Marriott Library now provides flash drives with templates for research posters for students to use to create their own posters. The Library will then print the posters at a cost often amounting to less than half the normal cost. The OUR was able to support 37 students, with funds to cover the cost of poster printing.
5. The annual Undergraduate Research Symposium typically sees 250 participants in a combination of oral presentations and posters sessions. This year, the Symposium hosted 300 students, considerably more than at any time in the past.
6. UROP Alumni who have graduated from medical schools in 2013:
  - Safia Ahmed** – Mayo Clinic Medical School
  - Justin Caron** – University of Utah School of Medicine
  - Robert Crosbie** – University of Utah School of Medicine
  - Michole Deesing** – Ross University School of Medicine (Portsmouth, Dominica)
  - Matthew Hedberg** – University of Pittsburgh School of Medicine
  - Jeff Jensen** – University of Utah School of Medicine
  - Devin Kearns** – Des Moines University School of Medicine
  - Cody Larson** – University of Utah School of Medicine
  - Milda Palionyte Shapiro** – Rocky Vista University College of Osteopathic Medicine
  - Sally Mimsy Tran** – University of Utah School of Medicine
  - Nancy Vu** – University of Utah School of Medicine

Other UROP Alumni Awards:

**Kara Arnold** – Miss Utah; accepted to the University of Utah School of Medicine

**Judy Vu, M.D.** – University of Utah Hospital, Outstanding Resident Award

Innovation:

**Abhijit Boppana** has been working with the Department of Mechanical Engineering to develop smart insoles that sense a person's gait, to help people with balance issues and rehab from various surgeries;

**David DaCosta** has been working with the Department of Mechanical Engineering on a solar powered dishwasher;

**David Toledo** and **Paul Slusser** have created the Power Pot produced by their start up, Power Practical; the company has shipped more than 1,000 units since summer 2012 and has raised over a million dollars in seed funding from Intel, Kickstarter and others.

7. Thanks to support from Senior Associate Vice President for Academic Affairs Martha Bradley, the part time position held by Andrea Haag as administrative assistant for the OUR, will be expanded to a full time position. This new administrative assistant position will enable the OUR to continue to expand as well as helping us to deal with our current work load in a more efficient way.

### UROP Learning Outcomes

The following Learning Outcomes, as defined by AAC&U, apply to students who are engaged in research through the OUR in UROP:

**Inquiry and Analysis** – In applying for UROP, a student must meet with a faculty sponsor and develop a research project. This requires that the student, in conjunction with the faculty sponsor, “Identifies an important and relevant problem, issue or question.”

As the UROP applicant is required to submit a research proposal as part of the application, she must

- a. “[state the problem] in a clear and appropriately focused way;” and
- b. In the form of a literature review, “[Present] thorough and relevant coverage of existing knowledge.”
- c. Design an inquiry that “uses all elements of relevant methodology...” Methodology constitutes an important part of the research project and evidence of attention to this is present in the research proposal.

During the research project, the student “synthesizes research/evidence to reveal new patterns,...” under the supervision of the faculty sponsor as well as graduate students and post docs.

At the end of the research project, the student submits an abstract that both “States a clear and insightful conclusion...” and “Identifies apparent and implicit limitations and implications...”

**Critical Thinking** – The research in which students in UROP are involved requires “A reasonable, clear ...hypothesis...[that] demonstrates some complexity of thought...” Research projects often consist of results that are based on scientific method, i.e. hypothesis, experiment, conclusion.

“Inferences about causal consequences are supported by evidence that has been evaluated from disparate viewpoints.” Methods and conclusions are subject to replication in other labs.

**Problem Solving** – A student’s research question (or hypothesis) must show a “...clear, complete understanding of [the] problem and [identify] specific factors that influence the approach to a problem...”

The student “Designs one or more strategies in the context of the problem, along with articulating the decision making framework.” This would constitute the design of an experiment and include an explanation of why the specific experiment might provide relevant data that would explain a given phenomenon. This could also apply to the design of a project in the arts or humanities.

**Creative Thinking** – While some aspects of creative thinking are relevant for UROP students involved in research in STEM disciplines, a certain percentage of students have a more direct relationship with creative thinking through work in the arts and humanities. These students clearly “Demonstrate willingness and ability to acquire skill and theory-based competence within a domain.” Creative domains in UROP have included music composition, modern dance choreography and performance, theatrical performance and production, and curating an art exhibit.

“Novelty and Uniqueness” are particularly present in all of the above mentioned artistic endeavors.

### **University of Utah Office of Undergraduate Research (OUR)**

The University of Utah’s Office of Undergraduate Research (OUR) houses a variety of opportunities for undergraduates interested in engaging in research or creative activity. These include

- The Undergraduate Research Opportunities Program (UROP) which provides undergraduate students with the opportunity to work with faculty sponsors on original research or creative projects. In addition to helping students find faculty sponsors, the program pays students an hourly wage amounting to \$1200 for a first semester and \$600 for a one-time renewal to work on their research. Students are accepted into the program on the basis of faculty-reviewed research/creative proposals.
- The University Undergraduate Research Symposium (required of all UROP students, but open to all students who have worked with a faculty sponsor);
- The Undergraduate Research Abstracts journal serving undergraduate researchers campus-wide.
- Research Posters on the Hill for which the Office of the Vice President for Research, the Office of Government Relations and the OUR, along with Utah State University, participate in sending students to an annual symposium at the Capitol each January consisting of research poster presentations.
- The Utah Conference on Undergraduate Research (UCUR), a state-wide undergraduate research conference that takes place at a different campus each year and which was first hosted by the University of Utah;
- The National Conference on Undergraduate Research (NCUR), an undergraduate research conference of students from all over the country;
- The Undergraduate Research Scholar Designation (URSD), a designation that will appear in the awards section of students’ transcripts upon graduation for undergraduates who have



completed a minimum of two semesters of research/creative activity with a faculty sponsor and who have presented at a research conference and published an abstract or paper.

The OUR received support used for named assistantships for UROP from the following donors:

- **Board of Advisors**
- **Dee Foundation**
- **Francis Family Foundation**
- **Parent Fund**

### Recipients of Named Assistantships for 2012-2013 and their Faculty Sponsors and Projects

*University of Utah Board of Advisors Assistantship (\$2,000, includes \$200 for supplies)*

**David DaCosta (Kuan Chen, faculty sponsor)**

Department of Mechanical Engineering

Effects of an Integrated Solar Water Heater on the Efficiency of a Solar Powered Dishwasher

*University of Utah Parent Fund Assistantship (\$1,950 academic year, includes 1 semester of supply funding)*

**Mikaelyn Miles (Norman Hu, M.D., faculty sponsor)**

Department of Pediatric Administration

Dynamics of the Vascular Development with Conotruncal Constricted Heart in Chick Embryo

*Janet T. and Lawrence T. Dee Foundation Assistantship (2 @ \$2,400)*

**Jacqueline Rodriguez (Les Chatelain, faculty sponsor)**

Department of Health Promotion & Education

A Retrospective Analysis of Vehicular Accidents Involving EMS and Fire Vehicles

**Karen Yu (Cynthia Berg, faculty sponsor)**

Department of Psychology

The Effects of Stress, Socioeconomic Status, Family and Friends on Regimen Adhering Behaviors Among Adolescents with Type I Diabetes

*Francis Family Foundation Assistantship (3 @ \$2,400)*

**Michael Marcinek (Joe Marotta, faculty sponsor)**

Department of Art and Art History

56 Frames: a Self Portrait

**Madeleine Oritt (Stephen Alder, M.D., faculty sponsor)**

Department of Family and Preventive Medicine

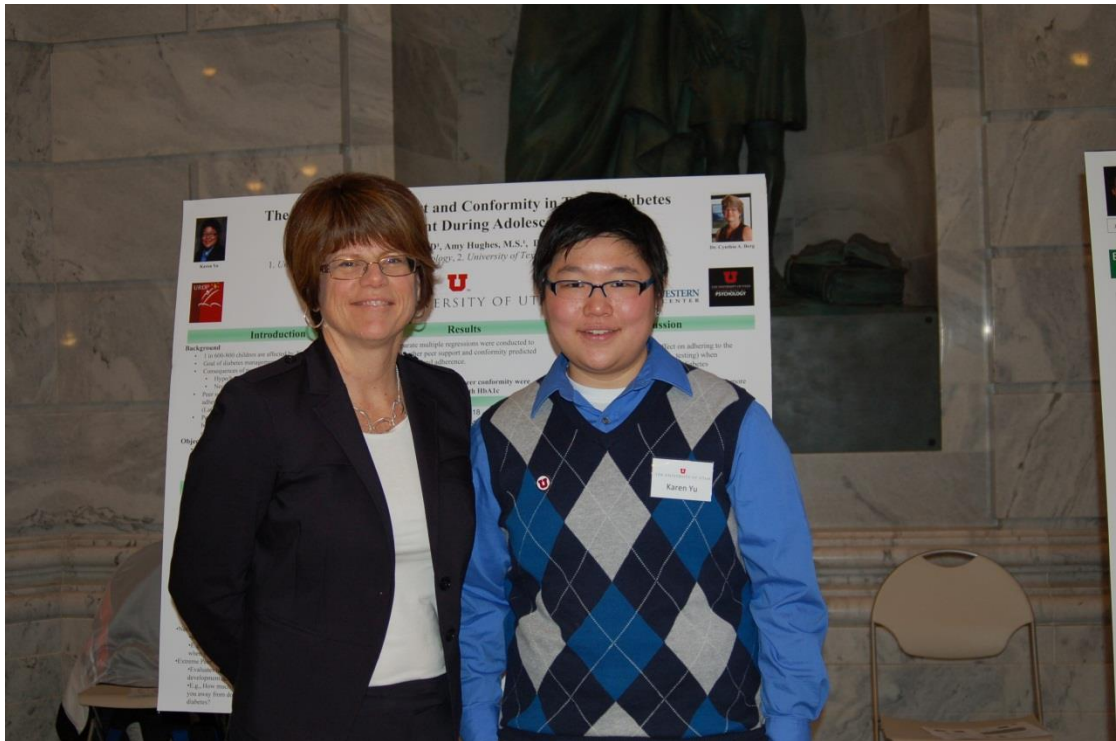
Accessibility to HIV/AIDS Medications in Resource-Limited Countries

**Annika Pecchia-Bekum (Alf Seegert, faculty sponsor)**  
Department of English

**Distance Lends Enchantment, But Who Fools the Bill?: An Interdisciplinary Analysis of Fairy Tales and the Virtualization of Nature**

The number of recipients of the **Undergraduate Research Scholar** designation which reached an unprecedented 168 students for the 2011-12 academic year, has continued to climb, reaching 191 students for the 2012-13 academic year plus summer. This designation, which appears in the awards section of a student's transcript upon graduation, can aid in enhancing graduate school applications as well as applications for employment.

This year's **Research Posters on the Hill** was again a great success and drew a significant number of legislators. The University of Utah was represented by 29 students on 26 projects who presented outstanding posters and had the opportunity to discuss these with legislators from their home districts. The occasion was again highlighted by a proclamation of undergraduate research week by Governor Gary Herbert, read by Lieutenant Governor Greg Bell as well as by an interview with OUR Associate Director Jill Baeder on Fox Channel 13.



**Karen Yu with faculty sponsor Cynthia Berg, Interim Dean of CSBS at Research Posters on the Hill**



Lieutenant Governor Greg Bell (3<sup>rd</sup> from right) with university administrators and students at RPOH

The annual **Undergraduate Research Symposium**, sponsored by the OUR and the Honors College, took place in the Olpin Union on April 2nd and consisted of 300 poster and oral presentations (up from 246 last year) including Honors Senior Thesis presentations. Keynote speaker Alexa Doig, faculty in the College of Nursing, gave an inspiring talk on undergraduate research in nursing.

The Symposium was, as in past years, the occasion for the announcement of the **Charles H. Monson Essay Prize**. Professor Charles H. Monson was a renowned teacher with a deep commitment to the understanding of social change. In his honor, through the generosity of Karl and Sharon Schatten, an annual prize of \$600 is awarded to an undergraduate who has done outstanding work on social change. This work, in the form of a research abstract is judged by a faculty panel made up of three members of the Undergraduate Council. This year the Monson Prize went to Madeleine Oritt. Ms. Oritt's winning essay, *Accessibility to HIV/AIDS Medications in Resource-Limited Countries*, was based on her abstract which was selected from among 300 abstracts submitted for the Symposium.

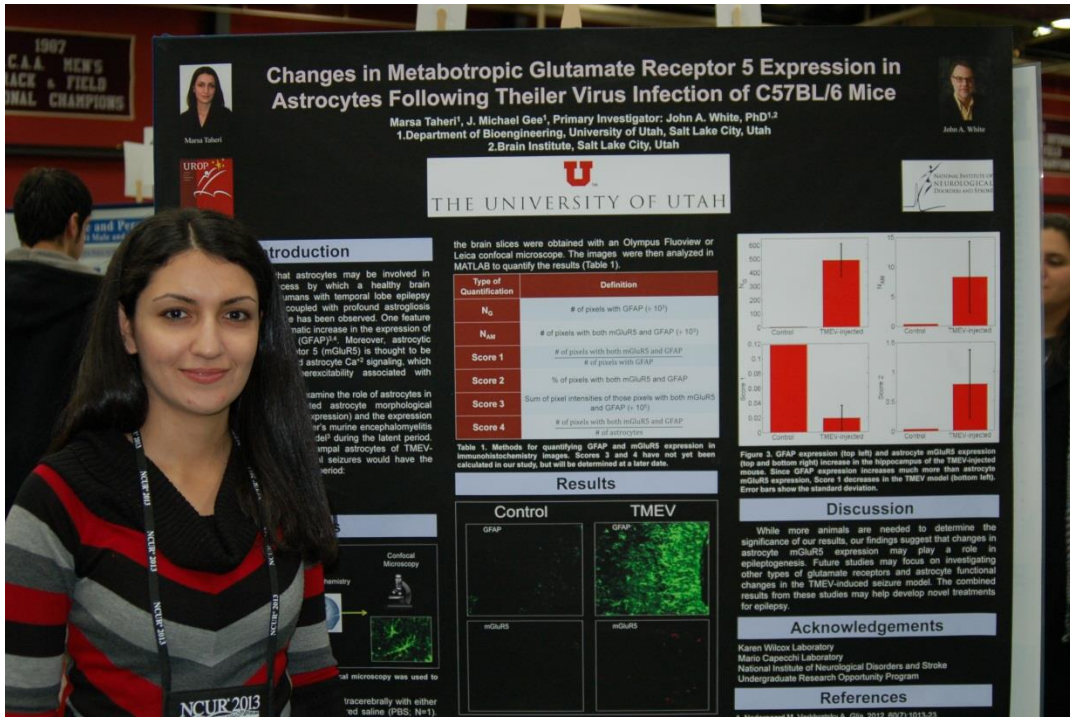


**Monson Essay Prize winner Madeleine Oritt**

The [Undergraduate Research Abstracts Journal](#), the special province of Associate Director Jill Baeder who is its editor in chief, continues in its 13<sup>th</sup> year of publication with a small run of 1500 copies for students, faculty, the University community, trustees and the legislature. The journal is also digitized by the Marriott Library as part of its on-line journal program. This year the journal, because of its ever increasing size, will be published for the first time ever in two volumes. As before, it will reflect the research and creative work from all 10 colleges of the University with many from the School of Medicine and Huntsman Cancer Institute. Monson Prize award winner Madeleine Oritt is featured along with her winning abstract and detailed information about the Monson Prize. The journal also includes sections devoted to Undergraduate Student Experts on Teaching (USET), Health Sciences LEAP and the Honors College.

This year 37 students attended the [National Conference on Undergraduate Research](#) (NCUR) which took place at the University of Wisconsin at La Crosse. OUR Associate Director Jill Baeder coordinated submissions, registrations and ASUU SAC funding, and along with OUR Director Steve Roens, attended the conference with the students.





Marsa Taheri with her poster at NCUR 2012



OUR Associate Director Jill Baeder with U of U students at NCUR 2012

## NEWS

OUR Associate Director **Jill Baeder** served as keynote speaker for the 2013 Utah Conference on Undergraduate Research at Utah State University.

This spring Associate Director **Jill Baeder** also received a Beacons of Excellence Award which will involve many activities in the coming year.

OUR Administrative Assistant **Andrea Haag** has accepted a new position in the Office of Undergraduate Research, working on the Block U. The OUR will miss her.



**Jill Baeder at the UCUR Banquet where she was the keynote speaker**

### **Analysis and Appraisal: Assessment of Strengths and Weaknesses**

We have continued to use the following assessment tools:

- Graded abstracts submitted by students as a final requirement for UGS 4800 (Undergraduate Research)
- On-line student evaluations for UGS 4800
- Survey of UROP participants by major (see Appendix).

The above assessment tools indicate:

- Continued high performance on the part of students;
- Continued student satisfaction;
- Continued success in our students' applications and acceptances to prestigious graduate schools.

Beyond assessing student satisfaction and performance, informal assessment of the health of the program indicates that:

- The goal of expansion continues to progress well – (see above); the continued growth can be considered a strength as well as a recurring goal; this goal has been significantly aided during the past year by the \$300,000 we received in Legislative Mission Based Funding which replaced the \$100,000 we received in Research Overhead funding for a net gain of \$200,000 to our budget for fiscal year 2012-13.
- The primary weakness during the past year has been the structure and functioning of the OUR. These areas have required significant attention

### **Recommendations/Actions**

In response to the analysis of our strengths and weaknesses we have the following recommendations. For the goal of expansion:

- Continue to use every opportunity to familiarize the campus with UROP and to involve the program in campus initiatives and events.

In response to the need for clearer structure and better functioning of the OUR

- Replacement of a part time Administrative Assistant with a full time Administrative Assistant
- Clear delineation of duties and expectations for all members of the OUR

## Appendix

### UROP Student Survey 2012-13



## Introduction

The sample for the UROP annual survey consisted of 87 respondents who had completed one or two semesters in UROP by spring of 2013. The first part of the survey provides demographic information as well as general information about work habits, involvement with research and research skills and plans for the future. The second part of the survey provides evaluation by the students of their experience in UROP.

Information from the first part of the survey has been and will continue to be used in publications and presentations to make a case for the great value of undergraduate research. Information from the



second part of the survey has been and will continue to be used to enhance the effectiveness of the program.