

2011 ELA RICE SYMPOSIUM EVALUATION

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Table of Contents

- 1 Introduction
- 2 Attendance and Demographics of Participants
- 3 Rating of the ELA Rice Undergraduate Research Symposium
- 4 Impact of ELA Rice Symposium on Students
- 5 Lessons Learned
- 6 Conclusion
- 7 Appendix

1 Introduction

The mission of Empowering Leadership Alliance @ Rice University is to support a diverse community of STEM (science, technology, engineering, mathematics) scholars at Rice, and encourage students to become academic leaders in their respective fields. ELA Rice organized the first ELA Rice Undergraduate Research Symposium held on January 22, 2011. The goal of the day-long meeting was to bring together a diverse group of undergraduate and graduate students, faculty and professionals with STEM backgrounds to:

- Ensure that undergraduates, especially underrepresented minority students, learn about and receive encouragement, knowledge, and advice about research early in their college studies.
- Allow students to connect with faculty, industry professionals, and peers to help create a supportive community beyond the symposium.
- Inspire undergraduates to pursue research over the summer, and eventually in graduate school and beyond.

To accomplish these goals, the symposium consisted of faculty talks (Richard Tapia, Jane Grande-Allen, Randall Hulet, and Enrique Barrera); a panel discussion of industry research professionals (John Rodriguez, Texas Instruments; Amanda Mosola; Exxon Mobil; and Ricardo Vargas, Shell); a poster session of graduate students' research, and a presentation on undergraduate research opportunities.

This evaluation is based on responses to an online survey conducted with students who participated in the research symposium. The two part survey can be viewed at <http://bitly.com/qlkeG5> and <http://bitly.com/ebWXpT>. Part A of the survey consisted of 26 multiple choice questions. Part B contained three open-response prompts. All 75 undergraduate participants completed the evaluation surveys. The surveys reveal that the symposium succeeded in fulfilling its goals in that 73% of the student participants were freshmen or sophomores; and 97% of all the undergrad participants strongly agreed or agreed that as a result of attending the research symposium, s/he is interested in learning more about doing research. Excellence in diversity was evident in regards to both race/ethnicity (36% African American/Black, 32% Hispanic, 17% Caucasian, 11% Asian, and 4% Asian Indian) and gender (66% female, 34% male). The italicized quotes below and throughout this report are taken from Part B of the student survey.

2 Attendance and Demographics of Participants

Seventy five Rice undergraduate participants attended the symposium, all of whom responded to the survey. Sixteen graduate students (14 out of 16 are in the Alliance of Graduate Education and the Professoriate or AGEPE program) participated in the poster session and shared their research with the undergraduates. The departments represented by the graduate students were: Electrical and Computer Engineering, Mathematics, Chemistry, Mechanical Engineering and Materials Science, Computational and Applied Mathematics, Ecology and Evolutionary Biology, Statistics, and Bioengineering.

The tables below represent the demographics of the undergraduate participants.

Year in school	Number	Percent
Freshman	37	49%
Sophomore	18	24%
Junior	9	12%
Senior	12	16%
Fifth year	0	0%
Other	0	0%

Gender	Number	Percent
Male	26	34%
Female	50	66%

Ethnicity	Number	Percent
Black	27	36%
Hispanic	24	32%
White	13	17%
Asian	8	11%
Asian Indian	3	4%

3 Rating the ELA Rice Undergraduate Research Symposium

Several of the survey questions asked students to rate the overall symposium and the individual activities of the day-long meeting. 98% responded as very satisfied or satisfied with the research symposium.

Overall, how satisfied were you with the research symposium?

Student response	Number	Percent
Very satisfied	43	57%
Satisfied	31	41%
Unsatisfied	1	1%
Very unsatisfied	0	0%
Don't know	1	1%

97% of the students are very likely or likely to attend another ELA Rice event, and 98% are very likely or likely to recommend attending an ELA Rice event to another student. Thus, extending and sustaining this diverse community beyond the symposium seems very likely with the continued student participation in future ELA activities.

Based on your experience of the research symposium, HOW LIKELY ARE YOU TO...	Very likely	Likely	Slightly likely	Not at all likely	Don't know
Attend another ELA Rice event?	58%	39%	3%	0%	0%
Recommend attending an ELA Rice event to another student?	57%	41%	1%	0%	1%

Participants rated both the faculty research talks by Dr. Grande-Allen, Dr. Hulet, and Dr. Barrera, and the industry research panel discussion as most valuable out of all the events.

The networking conversations with faculty, industry researchers and other students were also rated highly among students. The following are two striking student comments relative to these.

“The industry panel helped me explore a career option that I never really considered before. I always thought individuals with Ph.D.s had limited choices in the fields they could work in. Now I know that Ph.D.s are highly desirable in various disciplines (even those different from their Ph.D. focus). Their enthusiasm for research made me reevaluate my notion of industry research.”

“Dr. Barrera’s presentation on his own experience was genuine and very insightful. He gave very good advice on how to approach obstacles and preconceived notions of one’s own abilities. It made me recognize the potential that I have to succeed in graduate school. In addition, his clear approach to research methodologies and keen insight into research groups will help me develop into a better researcher.”

The table below ranks the meeting events using weighted average scores on a 4-3-2-1 scale.

Event	Very valuable = 4	Valuable = 3	Slightly valuable = 2	Not valuable at all = 1	Weighted Scale
Faculty researcher presentations	41%	46%	12%	1%	3.27
Industry researchers panel discussion	47%	37%	14%	0%	3.27
Informal conversations with faculty, graduate students, and industry researchers	37%	47%	12%	0%	3.13
Presentation on underrepresentation	41%	30%	24%	4%	3.06
Posters presentations by graduate students	32%	41%	20%	5%	2.57
The magic show	8%	39%	32%	20%	2.33

4 Impact of ELA Rice Symposium on Students

Students evaluated several statements about the impact of the research symposium. 97% strongly agree or agree that they are more interested in learning about doing research as a result of attending the symposium, and 91% strongly agree or agree that the symposium helped them to gain ideas about research, thus fulfilling ELA Rice's goals stated in the introduction.

As a result of attending the research symposium...	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
I am more excited about my major.	38%	42%	5%	1%	13%
I feel more connected to a supportive campus community.	47%	45%	3%	0%	5%
I know my peers better.	22%	57%	13%	0%	8%
I am interested in learning more about doing research.	36%	61%	1%	0%	3%

One of the undergraduates wrote about the encouragement she received from a faculty presenter. *"I did enjoy the research symposium, and I really felt more confidence coming out that I should keep on pursuing what I am doing now, even if I face struggles...[Dr. Grande-Allen] told me to keep pursuing Electrical Engineering because they need more women in that field."*

The research symposium has helped me to...	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
Develop confidence about doing research.	26%	58%	9%	0%	7%
Gain ideas about doing research.	25%	66%	3%	0%	7%
Gain ideas about faculty careers.	33%	51%	7%	0%	9%

Gain ideas about industry careers.	34%	54%	4%	0%	8%
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As research experiences for undergraduates (REUs) have been shown to positively influence students' interest in pursuing research as a career, it is encouraging that 74% expressed that participation in this symposium greatly increased or increased their interest in applying to summer research programs and that 73% stated that participation greatly increased/increased their interest in getting more information about graduate programs in their area of study. $\frac{2}{3}$ of the students responded that they will apply for a summer research program.

How did your participation in the research symposium affect your interest in...	Greatly increased	Increased	Slightly increased	No change	Decreased	Don't know
Continuing in your current educational program?	36%	30%	17%	16%	0%	1%
Getting more information about graduate programs in your area of study or a related field.	32%	41%	13%	13%	0%	1%
Applying to summer research programs in your area of study or a related field.	29%	45%	11%	16%	0%	0%
Pursuing an academic career as a professor in your major or a related field.	9%	18%	26%	43%	0%	3%

The following statement underscores the importance of research symposia for undergraduates, especially early on in their college career.

“I think it's super important to encourage underclassmen to keep looking for research and to be persistent, since it can be a discouraging process when most labs take only upperclassmen.”

Do you plan on applying to a summer research program in 2011?	Number	Percent
Yes	51	67%
No	9	12%
Don't know yet	16	21%

Networking is a key component of building a supportive community. 95% of students met faculty/researchers for the first time, and 45% of them met 3 or more. 93% met other students for the first time while 69% of them met 3 or more. The following statement reflects the importance of networking to students.

“I think this is a great opportunity, especially for underclassmen, to be exposed to professors, industry researchers and graduate students. It was a perfect way to network even with upperclassmen. I definitely think events like this should continue and I am glad I was able to take a part in this.”

Tell us about your networking at the research symposium. How many...	1 to 2	3 to 4	5 or more	None that I know of
Faculty or researchers did you meet for the first time?	50%	38%	7%	5%
Students did you meet for the first time?	25%	36%	33%	7%

Networking is usually not taught in a formal manner, but learned through social norms. Because many students from traditionally underrepresented groups may be the first in their family to attend graduate school in a STEM field, networking skills is a crucial part of the discussion for URM students as they navigate through the graduate school. The following student statement sums this up well:

“Dr. Tapia’s presentation opened my eyes to the challenges that underrepresented populations still face in the STEM field. It made me appreciate programs like ELA and AGEP even more. Furthermore, it made me aware that in order to succeed in graduate school and as an academic I need to prepare myself well and establish a strong network of faculty and graduate students that will support me in my endeavors.”

5 Lessons Learned

Overall, we view the research symposium as a success. However, improvements can be made for future symposia. Student participants were asked in the survey, “If you were to organize or help organize a research symposium, what would you do differently?”. Some of their suggestions along with reflection on my part are listed below:

More Graduate Student Involvement:

- Graduate students formally participated in the symposium as presenters during the hour long poster session. To help establish networking between graduate students and undergraduates, graduate students could be encouraged to attend all meeting events.
- Recruiting graduate students was a challenge. We were quite happy that 16 graduates agreed to participate. Next time, recruitment efforts would begin much earlier, months before the symposia in order to be able to attain a more diverse representation of STEM fields.
- One of the undergraduate participants suggested creating a partnering system at the beginning of the symposia to introduce undergraduates to graduate students. There would be no commitment after the meeting, but an initial introduction and networking opportunity would be created in a more structured way throughout the day-long meeting.
- Graduate students could lead break out discussion groups after faculty research talks and/or lead sessions on specific questions about getting into graduate school, finding a good mentor, etc.

More Advising Sessions

- Quite a few student participants suggested that a focus of the symposium not only be an informative: “What is faculty/industry research and why we love it”, but also include the “How?”. For example, offering mini sessions to improve one’s resume, interview for a lab/internship, or find out HOW to join a research lab group.

Logistics: (See agenda of meeting in appendix.)

- The Saturday meeting began at 9am and ended at 5pm. Since the college serveries do not open on the weekends until 9am, students suggested that we either begin a future meeting an hour later or serve breakfast.
- Many students suggested adding a mini-break in between the morning faculty research talks.

- During lunch and dinner, graduate students and faculty/industry guests would be asked to distribute themselves among the undergraduate students to provide more opportunities for conversation in small groups.

6 Conclusion

The following student comment encapsulates the evaluation of the 2011 ELA Rice Undergraduate Research Symposium:

“The ELA research symposium was a very beneficial event that should occur more often if possible. I understand the cost involved in such an event is high; however, this cost is well worth it.”

As suggested in the comment above, we plan to offer such meetings in the future.

“The research symposium was very engaging and helped me realize that Rice has a support system in place for minorities in the sciences. I had never heard of ELA before this event, so I hope that ELA will continue to hold more events such as the symposium to further inform minorities in the sciences about the opportunities they have before them and the adversities they must face.”

We believe that for Rice undergraduates, especially those from underrepresented minority groups, it is critical to offer motivation and support as they embark on the challenging road towards a STEM doctorate and a leadership position beyond.

7 Appendix

The agenda of the symposium was as follows:

Time	Rice Undergraduate Research Seminar	Location	Speakers
8:30-9 A.M.	Sign in	Martel Hall	
9-9:05 A.M.	Welcome and Introductions	McMurtry Auditorium	Dr. Richard Tapia
9:05 A.M.	Doing Scientific Research – What it is, Why I Love it, How it Fits into my role as a Faculty member	McMurtry Auditorium	Dr. Jane Grande-Allen
9:50 A.M.	Doing Scientific Research – What it is, Why I Love it, How it Fits into my role as a Faculty member	McMurtry Auditorium	Dr. Randy Hulet
10:35 A.M.	Break	Martel Hall	
11:00 A.M.	Poster Session	Martel Hall	Rice graduate students*
12:00 P.M.	Lunch	Martel Hall and classrooms	
1:00 P.M.	Doing Scientific Research in Industry (panel)	McMurtry Auditorium	Dr. Amanda Mosola, Exxon-Mobil; Dr. Ricardo Vargas, Shell; Dr. John Rodriguez, Texas Instruments
2:00 P.M.	The Research Group Process: Team members' roles, Interdisciplinary nature of research	McMurtry Auditorium	Dr. Enrique Barrera
2:45 P.M.	Break	Martel Hall	
3:15 P.M.	Educating Texas's Future Innovators	McMurtry Auditorium	Dr. Richard Tapia

4:00 P.M.	Summer Opportunities	McMurtry Auditorium	Alice Fisher, Justin Lopez, Bridgette Bennett
4:15 P.M.	Magic show	McMurtry Auditorium	Dr. Enrique Barrera
5:00 P.M.	Conclusion	McMurtry Auditorium	Alice Fisher
6:00 P.M.	Shuttle transportation arrives at Duncan.	In front of Duncan Hall	
6:30 P.M.	Dinner Downtown at Irma's Restaurant		