



BOARD MEETING

June 29, 2015

BOARD MEETING AGENDA MONDAY, JUNE 29, 2015 | 1:00-3:00 P.M. MICROSOFT CAMPUS

I. Meeting Called to Order		Brad Smith Board Chair	1:00p
II. Approval of Minutes from March 17, 2015 Board Meeting	[Tab A]	Brad Smith	1:00-1:05p
III. WSOS Scholar Spotlight	[Tab B]	Riley Germanis	1:05-1:15p
IV. Presentation of 2015 Graduate Survey	[Tab C]	Jeff Knudsen Kimber Connors, College Success Foundation	1:15-1:35p
V. Development/Advocacy Update & Discussion	[Tab D]	Brad Smith Naria K. Santa Lucia	1:35-1:50p
VI. Activities Update (Program, Events, Media)	[Tab E]	WSOS Staff	1:50-2:10p
VI. Finance Update	[Tab F]	Paul Kruglik, CFO College Success Foundation	2:10-2:20p
VII. Presentation of FY16 Work Plan and FY16 Program Administrator Scope of Work & Key Deliverables	[Tab G]	Naria K. Santa Lucia Executive Director	2:20-2:30p
VIII. Executive Session		WSOS Board Members	2:30-3:00p
IX. Adjourn		Brad Smith	3:00p
Appendix	[Tab H]		

2015 Upcoming Meeting Dates:
Wednesday, September 23, 2015
Tuesday, December 15, 2015

Tab A

Minutes from March 17, 2015 Meeting



WASHINGTON STATE OPPORTUNITY SCHOLARSHIP BOARD MEETING MARCH 17, 2015, 1:00-3:00 P.M., MICROSOFT CAMPUS MINUTES

The Board of Directors of the Washington State Opportunity Scholarship (WSOS) met on March 17, 2015 at the Microsoft headquarters in Redmond, Washington.

Board members present: Brad Smith (Board Chair), Miller Adams, Diane Cecchettini, Stan Deal, Jerry Grinstein, Mack Hogans, Jane Park; Jim Sinegal via telephone.

Additional attendees: Naria Santa Lucia, Jane Broom, Caroline Maillard, Dave Stoler, Erin Ashley, Theresa Britschgi, Karyl Gregory, Juliette Schindler Kelly, Jeff Knudsen, Paul Kruglik, Megan Nelson, Vickie Rekow, Larry Wright, Yarely Gomez, Violet Boyer, Dr. Michael Quinn, Dr. Martin Jackson

Meeting Called to Order

Having a quorum of the Board, Brad Smith, Board Chair of WSOS, welcomed everyone to the board meeting at 1:04 pm.

Mack Hogans moved that the minutes of the December 18, 2014 meeting be approved. Jane Park seconded the motion. The motion carried unanimously.

New Board Member

Smith asked all attendees to introduce themselves. Smith welcomed everyone to the board meeting and introduced Diane Cecchettini as our newest board member. Cecchettini provided a summary of her background in the healthcare sector.

Scholar Spotlight

Naria introduced Yarely Gomez as one of our WSOS Scholars. Yarely shared her experience as a first generation college student. She also shared the many wonderful opportunities which have opened to her because of the WSOS scholarship. She expressed high praise for the scholarship and support services she has received.

Presentation from Independent Colleges of Washington

Violet Boyer, President & CEO of the Independent Colleges of Washington (ICW), explained that ICW is an association of 10 private, nonprofit colleges in the state whose member institutions share a commitment to high-quality, academically rigorous learning, and to an education that emphasizes critical thinking, lifelong learning, ethics, leadership, and community service. Boyer then introduced representatives from two of ICW's member institutions to share the STEM focus at their university: Dr. Martin Jackson, Associate Academic Dean at the University of Puget Sound, and Dr. Michael Quinn, Dean of the College of Science and Engineering at Seattle University.



Scholarship Services, Cohort 4, Eligible Majors

Larry Wright, Chief Operating Officer at CSF, expressed regrets that Yolanda Watson Spiva, CSF President & CEO, could not attend the board meeting. Wright then explained the basic difference in mission between CSF and WSOS.

Wright introduced Vickie Rekow, Director of Scholarship Services, who reported that 2.4 staff work on WSOS. Rekow identified the scope of work and activities her department accomplished for WSOS in 2013-14. Rekow then explained that Cohort 4 applications were submitted January 5th – March 2nd and reported there was a 36% increase in submitted applications over last year. Rekow presented a summary of the Cohort 4 applicants and compared this year's data to last year's data.

Rekow then presented proposed Cohort 4 selection criteria for the purpose of awarding the scholarship. The eligibility criteria for applicants includes their GPA, must be a graduate of a WA high school, must be attending a WA college, have less than a certain number of credits, and their family income this year must be less than \$105,000 for a family of four.

Rekow then presented proposed selection criteria which includes keeping the tiered scholarship amounts by class level, weighting GPA at 80% and first generation at 20%, and selecting 780 applicants assuming 750 of them will enroll. The projected scholarship expenditure for Cohort 4 will be \$10.1M based on current retention assumptions.

Discussion ensued regarding expanding the number of selected applicants. A decision was made that the final number of applicants will be decided no later than April 15th based on upcoming fundraising activities with the intent of using those additional funds to provide scholarships to more applicants beyond the selected 780, perhaps up to 1000 applicants. Eligible applicants are yet to be determined but 1200 – 1500 are projected to be qualified applicants. A teleconference meeting with the Board will be scheduled the week of April 13th to determine the actual number of selected applicants.

Jane Park suggested another selection criteria could be added based on employment needs within WA. Our Board would decide which fields of study are utilized based on which disciplines are in high demand.

Smith stated that we should notify WA legislators that the WSOS wants to increase the number of awardees or increase the award by class level.

Caroline Maillard reported that a working group convened on March 10th to review eligible majors. That working group has recommended the Board accept new new majors: Diagnostic Medical Sonography and Clinical Laboratory Science. Maillard further reported that the working group will contact community partners to research what "high-demand fields" mean and how they would apply to the decision-making process for the WSOS Board. Maillard stated that there are 2,200 sanctioned majors in WA, 400+ of which are high-demand STEM/healthcare majors.



Maillard stated that Public Health and Environmental Health were identified as possible new majors but the working group believes those two majors need further research.

Miller Adams moved that the two recommended new majors of Diagnostic Medical Sonography and Clinical Laboratory Science be approved. Jerry Grinstein seconded the motion. The motion carried unanimously.

Activities Update

Naria Santa Lucia presented an update on the current and upcoming programmatic outreach events, pipeline development, and STEM support services.

Santa Lucia identified unique Development activities including a Ballmer meeting this week and various events called donor cultivation events. Erin Ashley, Director of Corporate Events, described the special Eat, Drink and Tech Dinner at the Four Seasons Hotel on April 7th as well as other upcoming OpportunityTalks events. Ashley indicated additional board leadership is needed as Co-chairs and Executive Event Committee members for those events. The goal of these OpportunityTalks is to engage prospective partners.

Santa Lucia presented an update on Advocacy efforts with legislative members in Olympia. For each meeting, a WSOS Scholar was represented.

Santa Lucia reported on the Media outreach through print media in five different published articles, Facebook, Twitter, and E-News.

Finance Update

Hogans met with the Investment & Finance Committee last week to review financials for the last quarter of 2014. He reported that a first quarter report was received from WSIB. Hogans reminded the Board that WSIB cannot use public funds in equities.

Hogans reported that the Investment & Finance Committee elected Peter Harvey as Vice Chair on the committee to replace Terry Gillespie who resigned last fall. Hogans stated that the Committee needs to recruit at least one more committee member. Names of suggested individuals can be forwarded to him.

Hogans further reported that the Attorney General's office has not yet issued a decision on allowing public funds to be invested in equities. Dave Stolier, Assistant Attorney General, reported that there is no timeline for that decision.

Paul Kruglik, Chief Financial and Administrative Officer (Interim), provided a financial update. Kruglik reported that during last quarter, \$5M was received by Boeing on their pledge. He further reported that \$43M to date has been sent to WSIB to



manage with \$30M in private and state scholarship funds and \$13M in private and state endowment funds. He also reported that portfolio returns since inception stand at .66% for equity returns and .47% for fixed income returns.

Kruglik reviewed the WSOS balance sheet, income statement, and cash flow through 1/31/15. Kruglik also presented the distribution of funds through 1/31/15 among four accounts and reviewed operating expenses through June 2015.

Upcoming Meeting and Closing

The next board meeting is scheduled on Tuesday, June 30th, at 1:00 – 3:00 pm at Microsoft. At that meeting, the Board will cover these two topics: CSF contract and the results of the Post-Graduation Survey.

The meeting adjourned at 3:04 pm.

Respectfully submitted,
Karyl Gregory

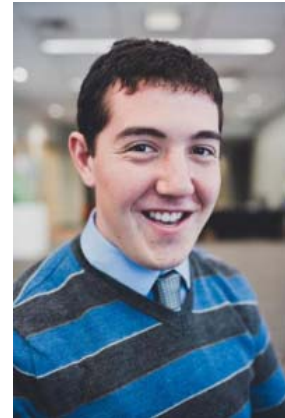
Tab B

Scholar Spotlight – Riley Germanis

SCHOLAR PROFILE

RILEY GERMANIS

Riley grew up in Federal Way, Washington, where he was very involved in both his school and his community. Riley excelled in math and quickly began to think about a future in teaching where he could combine his love of problem solving and helping others. Though he had always intended to go to college, his family found themselves in financial hardship as Riley prepared to enroll at Western Washington University. He received some financial aid and scholarships but still needed to take out loans in order to embark on his college journey.



Part way through earning his degree, Riley learned he received WSOS as a part of its first cohort of recipients which enabled him to continue to pay for school and not accumulate an overwhelming amount of debt. With his eyes set on graduate school, Riley was grateful and relieved to join the WSOS community which not only supported him financially, but also offered him professional development and skill-building opportunities. In 2013, Riley graduated with a bachelor's degree in mathematics from WWU.

Riley completed his student teaching at Aviation High School in the Highline School District, worked as a private math and SAT-prep tutor, and is currently working on his Masters in Teaching Math and Science (MTMS) degree at Seattle Pacific University. Riley was recently selected as a Teaching Fellow by the Knowles Science Teaching Foundation. He also writes and maintains his own blog, *Excellence in Math Education*, sharing his reflections on teaching, learning and student development. Being a WSOS recipient has inspired Riley to talk with his students about their futures and college, and help them consider avenues for achieving a college education including scholarships and other opportunities.

Riley's take on WSOS: "Entering college, my family struggled for money. It was challenging having both parents lose their job during the recession in 2008 and use my college money to pay off debts. With the help of the College Success Foundation and the Washington State Opportunity Scholarship, I have been able to attend college and pursue a challenging and high demand field (Mathematics). With the help of the scholarship, I am able to afford to attend graduate school and become a more valuable professional."

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The College Success Foundation (CSF) is the program administrator for the Washington State Opportunity Scholarship.

Tab C

2015 Graduate Survey



Supporting the next generation of STEM & health care leaders

MEMORANDUM

To: Washington State Opportunity Scholarship Board of Directors

From: Naria K. Santa Lucia
Executive Director

Date: June 22, 2015

Subject: 2015 Post-Graduation Survey

This spring, the CSF Research and Evaluation team conducted the 2015 WSOS Post-Graduation Survey. Key highlights include:

- » Nearly three-quarters of graduates seeking employment have found work in their field of study (up from two-thirds in 2014).
- » Among graduates securing post-graduation employment in their field of study, 86% remained in Washington.
- » Most WSOS graduates earn between \$40,000 and \$80,000 within one year of graduating.

Please see the full report attached here.

2015 WSOS POST-GRADUATION EMPLOYMENT SURVEY FINDINGS

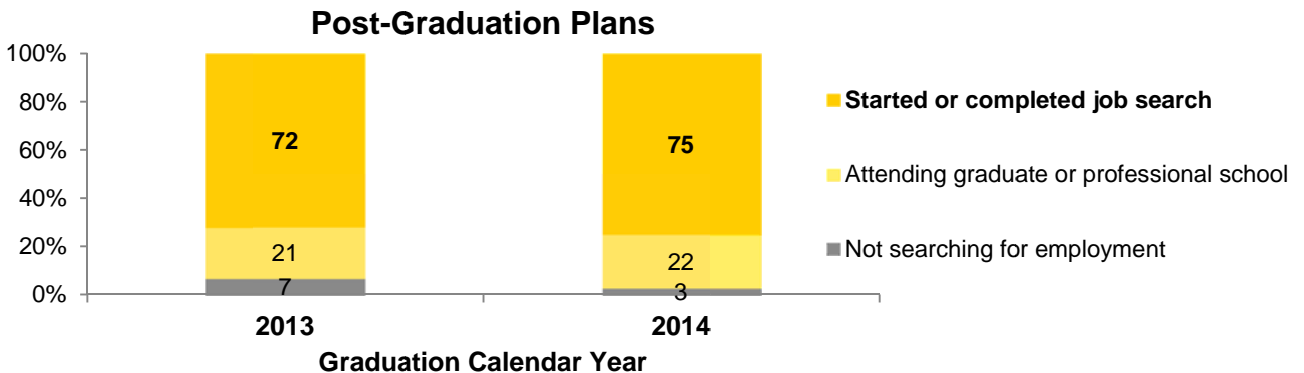
June 2015

INTRODUCTION

In mid-March through early-April 2015, the College Success Foundation’s Research, Evaluation, Planning and Accountability Department administered the Post-Graduation Survey to the 567 Washington State Opportunity Scholarship recipients who had earned their bachelor’s degrees in calendar year 2014. In total, 264 out of 567 (47 percent) of the 2014 WSOS graduates responded to the survey. Since this sample is demographically similar to the overall population, we are confident that the results are representative of this group of graduates overall. As displayed in Appendix A, survey respondents are representative of the overall WSOS graduate sample based on key demographics (gender, ethnicity and area of study). Results are therefore seen as generalizable.

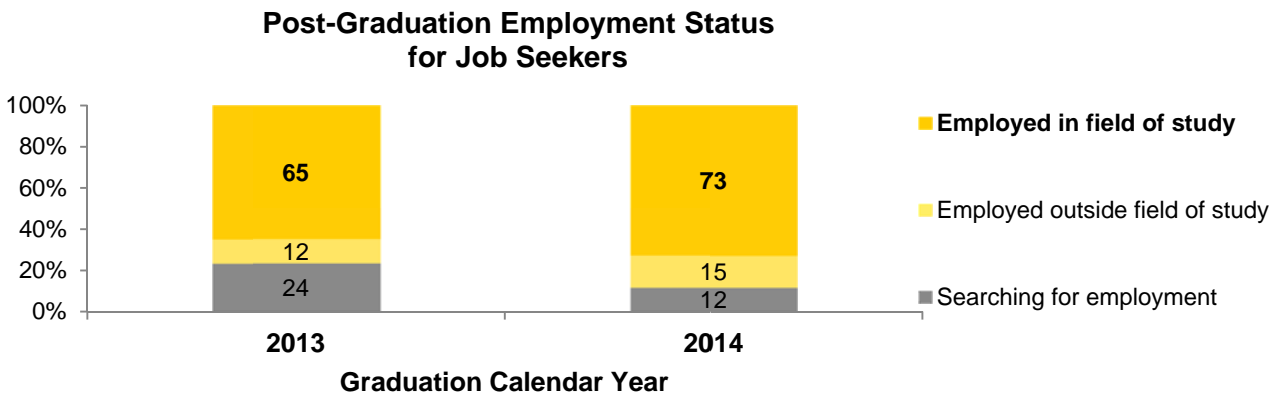
THREE-QUARTERS OF GRADUATES HAVE FOUND OR ARE SEEKING EMPLOYMENT AND TWENTY-TWO PERCENT ARE OR WILL BE ATTENDING GRADUATE SCHOOL

Among the 264 respondents, 75 percent have started or completed their search for post-graduation employment, 22 percent are or will be attending graduate or professional school, and 3 percent have not started their employment search for other reasons. Compared to last year’s graduating class, this represents a 3 percent increase in the proportion of graduates searching for employment and a 1 percent increase in the proportion attending graduate or professional school. These differences are not statistically significant, which indicates the beginning of a trend whereby we may expect that within one year of graduation approximately 74 percent of WSOS graduates will start or complete their job search, 22 percent will attend graduate or professional school, and 5 percent will wait longer than one year to decide upon their post-graduation path.



NEARLY THREE-QUARTERS OF GRADUATES WHO SOUGHT EMPLOYMENT ARE EMPLOYED WITHIN THEIR FIELD OF STUDY

Among those who sought employment, 73 percent are employed within their field of study, 15 percent are employed outside of their field of study, and 12 percent are not employed and are currently searching for work. Compared to last year's graduating class, this represents an 8 percent increase in the proportion of job seekers employed in their field of study and a 3 percent increase in the proportion employed outside of their field of study. These differences are not statistically significant, which indicates the beginning of a trend whereby we may expect that within one year of graduation approximately 69 percent of WSOS graduates who seek employment are employed within their field of study, 14 percent are employed outside of their field of study, and 18 percent are still searching for employment.

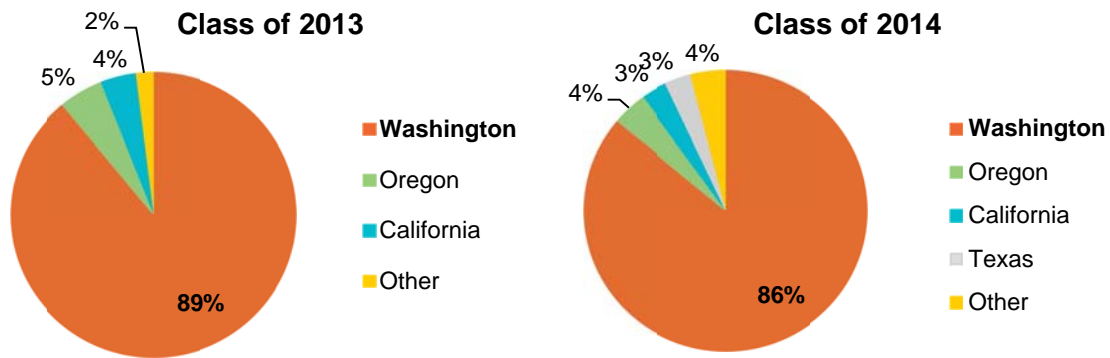


Among those employed outside of their field of study, nearly two-thirds (64 percent) are still searching for employment within their field of study. As a result, the remaining analyses focus on the subset of respondents who indicated that they were employed in their field of study (n=141; 53 percent of the sample).

MOST EMPLOYED WSOS GRADUATES STAYED IN WASHINGTON STATE

Among graduates securing post-graduation employment in their field of study, 86 percent are working in Washington state, compared to 89 percent of last year's graduating class. Graduates report being employed at nearly 100 diverse companies and organizations (see Appendix B for a full list of companies where WSOS graduates are employed by field of study.) This difference is not statistically significant, which indicates the beginning of a trend whereby we may expect that within one year of graduation approximately 88 percent of WSOS graduates employed within their field of study will remain in Washington state.

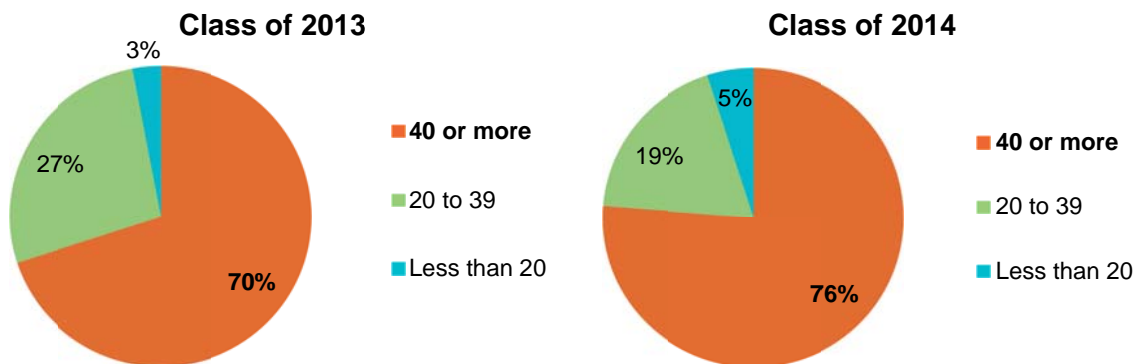
Job Location of Graduates Employed in Field of Study



MOST EMPLOYED WSOS GRADUATES ARE WORKING FULL TIME

Among WSOS graduates employed in their field of study, 76 percent are employed full time, compared to 70 percent of last year's graduating class. This difference is not statistically significant, which indicates the beginning of a trend whereby we may expect that within one year of graduation approximately 73 percent of WSOS graduates who are employed within their field of study will be employed full-time.

Hours Worked Weekly of Graduates Employed in Field of Study



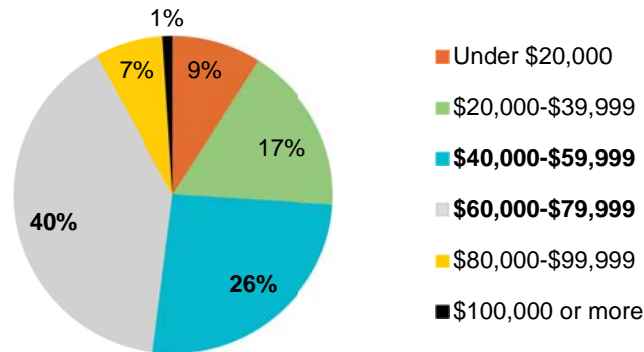
MANY EMPLOYED WSOS GRADUATES HAD PREVIOUS INTERNSHIP OR WORK EXPERIENCE WITH THEIR CURRENT EMPLOYER

Among graduates employed in their field of study, 34 percent previously interned or worked for their current employer in another role, compared to 32 percent of last year's graduating class. This difference is not statistically significant, which indicates the beginning of a trend whereby we may expect that one-third of WSOS graduates who are employed within their field of study had previously interned or worked for their employer.

NEARLY TWO-THIRDS OF WSOS GRADUATES EMPLOYED FULL-TIME IN THEIR FIELD OF STUDY EARN BETWEEN \$40,000 AND \$80,000 WITHIN ONE YEAR

Nearly two-thirds (66 percent) of graduates employed full-time within their field of study report earning between \$40,000 and \$79,999 per year. Approximately one-quarter (26 percent) report earning under \$40,000. The remaining 8 percent report earning \$80,000 or more per year. These figures are comparable to average starting salaries for 2014 STEM graduates nationwide, which range from \$33,200 to \$64,900.¹

**Annual Salary for Graduates
Employed Full-Time in Field of Study**



¹ National Association of Colleges and Employers. (2015). STEM Graduates: Salary Expectations Fall Short of Actual Salaries. Retrieved from, <https://www.naceweb.org/s04152015/salaries-for-stem-graduates.aspx>.

APPENDIX A: DEMOGRAPHICS OF WSOS GRADUATES

The WSOS Post-Graduation Survey respondents are representative of the gender distribution of all WSOS graduates within 1 percent.

TABLE 1: GENDER

GENDER DISTRIBUTION	WSOS GRADUATES		POST-GRAD SURVEY	
	#	%	#	%
FEMALE	289	51	132	50
MALE	278	49	132	50
TOTAL	567	100	264	100

The WSOS Post-Graduation Survey respondents are representative of the race/ethnicity distribution of all WSOS graduates within 1 to 2 percent.

TABLE 2: RACE/ETHNICITY

RACE/ETHNICITY DISTRIBUTION	WSOS GRADUATES		POST-GRAD SURVEY	
	#	%	#	%
AMERICAN INDIAN OR ALASKA NATIVE	3	1	3	1
ASIAN	117	21	57	22
BLACK OR AFRICAN AMERICAN	14	2	5	2
HISPANIC/LATINO OF ANY RACE(S)	33	6	21	8
NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER	2	0	0	0
TWO OR MORE RACES	33	6	12	5
WHITE	346	61	159	60
NOT PROVIDED	19	3	7	3
TOTAL	567	100	264	100

Overall, the WSOS Post-Graduation Survey respondents are closely representative of the fields of study of all graduates. Survey respondents represent slightly higher proportions of biology majors (27 percent in the sample vs. 24 percent of all graduates), engineering majors (28 percent in the sample vs. 25 percent total), physical science majors (7 percent in the sample vs. 6 percent total), and mathematics majors (6 percent in the sample vs. 5 percent total). Survey respondents represent slightly lower proportions of health professions and related programs (17 percent in the sample vs. 19 percent total) and computer science majors (7 percent in the sample vs. 9 percent total).

APPENDIX B: COMPANIES OR ORGANIZATIONS WHERE WSOS GRADUATES ARE CURRENTLY EMPLOYED

Biological and Biomedical Sciences

- » 8 to 8 Dental
- » AmeriCorps
- » Auburn University
- » Benaroya Research Institute
- » Cordant
- » Fred Hutchinson Cancer Research Center
- » National Institute of Health
- » Rigaku
- » Scribe America
- » Seattle Biomedical Research Institute
- » Seattle Children's Research Institute
- » United States Forest Service
- » University of Washington Immunology
- » Washington Department of Fish and Wildlife
- » Washington State University

Computer and Information Sciences and Support Services

- » AT&T
- » Financial Pacific Leasing
- » Inkstone
- » Microsoft
- » PACCAR
- » PLEXSYS Interface Products, Inc.
- » Smart Group Consulting
- » TEKsystems
- » Trov
- » University of Washington Grant and Contract Accounting

Engineering

- » Aerospace & Defense Company
- » Alcoa
- » AMX by Harman
- » Avista Corporation
- » Bechtel
- » Boeing
- » Cadence Biomedical
- » Ch2m Hill
- » Colmac Industries
- » Cypress Semiconductor
- » Department of Energy
- » Dibble Engineers
- » Doyon Anvil
- » F5 Networks
- » Fluke Corporation
- » Georgia-Pacific
- » Gray & Osborne
- » High Speed Interconnects
- » IBM Corporation
- » Intel Corporation
- » Kapstone Paper
- » Kimley-Horn and Associates
- » LiveAreaLabs
- » Microsoft
- » Navair
- » NYtec
- » PLSA Engineering and Surveying
- » Protingent
- » Puget Sound Naval Shipyard
- » Radiant Vision Systems
- » Raytheon
- » RECSILICON
- » Red Dot Corporation
- » Scaled Composites
- » Schweitzer Engineering
- » Snohomish County Public Utility District
- » T-Mobile
- » Tacoma Power
- » Texas Instruments
- » Washington State Department of Transportation

Health Professions & Related Programs

- » American Medical Response
- » BaseCamp Fitness
- » Center for Discovery
- » CHI
- » Forest View Transitional Health Center
- » Integrated Dental Arts
- » Jesuit Volunteers Corps and the Native American Health Center
- » Medstar Health
- » Multicare Health Systems
- » Northpointe Family Dentistry
- » Doernbecher Children's Hospital
- » Oregon Health & Science University
- » Overlake Hospital
- » PeaceHealth Southwest Medical Center
- » Providence Health & Services
- » Puget Sound Kidney Center
- » Rockwood
- » Seattle Children's Hospital
- » Skagit Valley Hospital
- » St. Joseph's Medical Center
- » Swedish Medical Center
- » University of Washington Medical Center
- » Veteran's Affairs Medical Center
- » Virginia Mason Medical Center
- » Yakima Valley Memorial Hospital

Mathematics and Statistics

- » Atomic Moguls, Inc.
- » Center for Education Data and Research
- » Haggen
- » Milliman Health
- » South Puget Sound Community College
- » Sylvan
- » Western Washington University

Natural Resources and Conservation

- » Department of Energy
- » Harris County Flood Control District
- » Pacific States Marine Fisheries Commission
- » US Forest Service
- » Washington Conservation Corps

Physical Sciences

- » GeoEngineers
- » Horizon Mud Logging, LLC
- » SNBL USA
- » University of Washington Lee Lab of Applied Biophysics
- » Virginia Mason

Science Technologies/Technicians

- » Boeing
- » CWH Hospital
- » Eagle Automation
- » TCS America

Tab D

Development/Advocacy Update



Supporting the next generation of STEM & health care leaders

MEMORANDUM

To: Washington State Opportunity Scholarship Board of Directors

From: Naria K. Santa Lucia
Executive Director

Date: June 22, 2015

Subject: 2014-15 Development and Advocacy Successes

We are so excited to report that since the March 2015 WSOS Board meeting, WSOS has raised an additional \$41 million in private contributions to fund scholarships and support programs!!

These gifts include not only the \$20M from the Rubens Family Foundation, but also \$11 million from a Washington-based family foundation which was cultivated by Brad Smith and Jane Broom. In addition to these phenomenal gifts, Microsoft has agreed to increase their commitment by \$10 million over three years. These private contributions will not only allow us to greatly increase the number of Scholars funded, they will also help us firm up the appropriation for the state match in the 15-17 Biennial budget.

With these gifts, WSOS has raised \$94M in private funds with approximately \$81.5M for the Scholarship Fund and \$12.5M for the Endowment Fund. Assuming that all private funds are matched by the State of Washington and once all private pledge payments and state match funds have been received, the Endowment account balance will stand at ~\$25M and we will have ~\$5M in private funds left to raise to fully fund the current scholarship obligation through 2021.

In light of these fundraising successes, the WSOS staff and CSF's Scholarship Services and Finance teams have started to model potential options for program expansion. To that end, the attached material presents: (1) the WSOS cash flow projection through 2026 with current private commitments, and (2) initial ideas for future programming efforts and associated fundraising additions.

WSOS Cash Flow Projection Summary

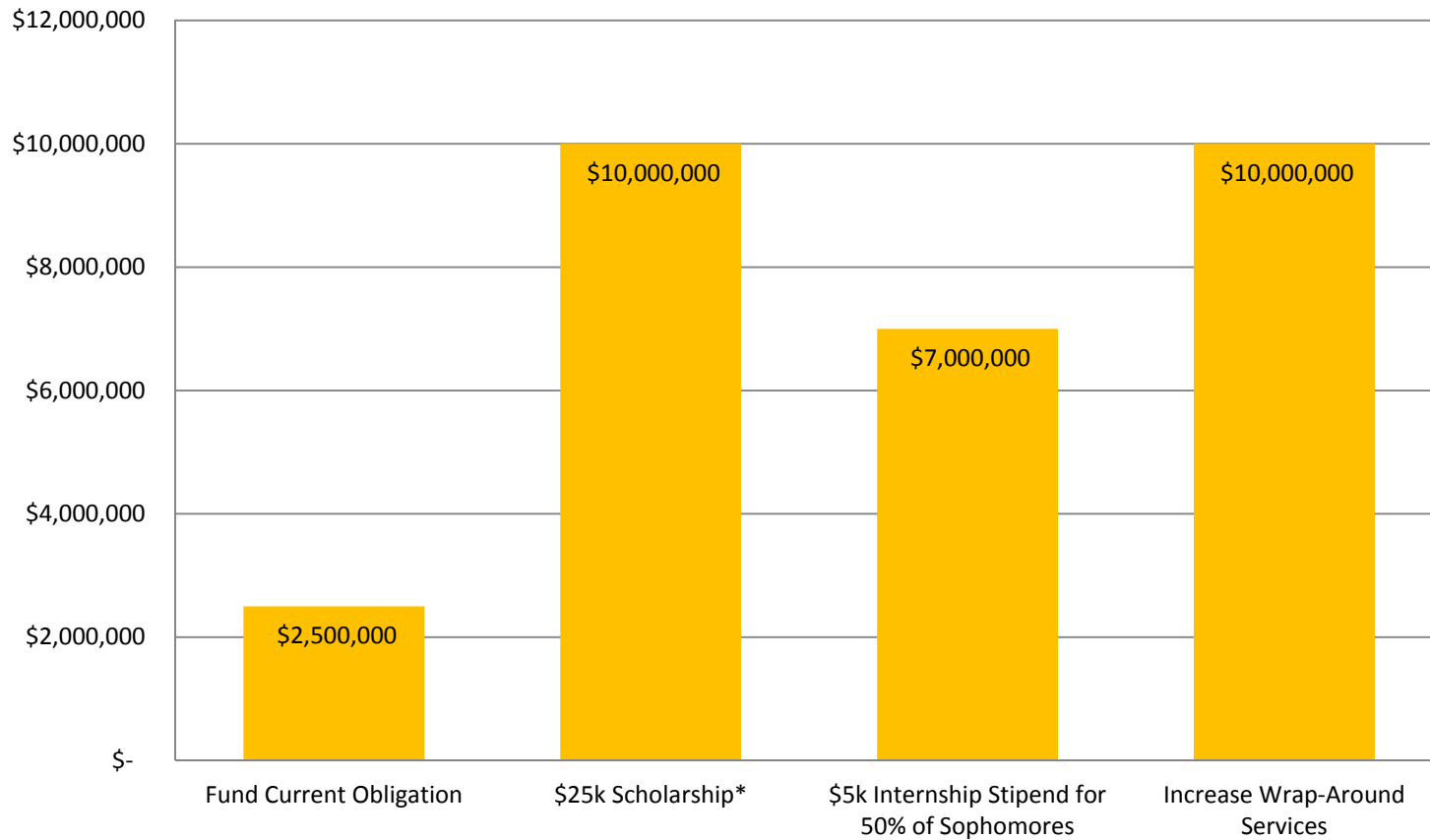
2014 YTD / 2015 - 2026 Projected

As of January 31, 2015



	2015P	2016P	2017P	2018P	2019P	2020P	2021P	2022P	2023P	2024P	2025
Scholarship Account Account											
Beginning Balance	35,520,912	45,215,784	60,156,092	72,067,658	60,749,899	54,499,027	41,170,495	20,176,556	5,311,143	(1,633,117)	(4,499,819)
Sources											
Contributions											
Private	10,476,268	16,320,000	18,320,000	-	5,000,000	5,000,000					
State Match (2014 Appropriated; 2015 on, projected)	12,500,000	12,500,000	10,000,000	10,000,000	10,000,000	4,000,000	-				
Investment Income	355,209	452,158	601,561	720,677	607,499	544,990	411,705	201,766	53,111	(16,331)	-
Total Scholarship Fund Receipts	23,331,477	29,272,158	28,921,561	10,720,677	15,607,499	9,544,990	411,705	201,766	53,111	(16,331)	-
Uses											
Scholarships	(11,836,605)	(12,427,250)	(14,972,072)	(20,000,514)	(19,820,449)	(21,523,522)	(20,055,643)	(14,167,179)	(6,497,371)	(2,700,371)	(482,764)
Program Operations (WSOS and CSF, Marketing)	(1,800,000)	(1,904,600)	(2,037,922)	(2,037,922)	(2,037,922)	(1,350,000)	(1,350,000)	(900,000)	(500,000)	(150,000)	(50,000)
TOTAL EXPENSE	(13,636,605)	(14,331,850)	(17,009,994)	(22,038,436)	(21,858,371)	(22,873,522)	(21,405,643)	(15,067,179)	(6,997,371)	(2,850,371)	(532,764)
ENDING BALANCE	45,215,784	60,156,092	72,067,658	60,749,899	54,499,027	41,170,495	20,176,556	5,311,143	(1,633,117)	(4,499,819)	(5,032,583)

Approx. Additional Private Investment Needed



*\$25k Scholarship (\$2.5k – Fr/Soph; \$7.5k – Jr/Sr; \$5k – 5th Yr)

WSOS Cash Flow Projection Summary

2014 YTD / 2015 - 2026 Projected

As of January 31, 2015



	2015P	2016P	2017P	2018P	2019P	2020P	2021P	2022P	2023P	2024P	2025
Endowment Account											
Beginning Balance	16,526,637	21,688,903	24,405,792	24,649,850	24,896,349	25,145,312	25,396,765	25,650,733	25,907,240	26,166,313	26,427,976
Sources											
Cash Contributions											
Private											
State Match											
Pledge Payments											
Private	2,500,000										
State Match (2014 Appropriated; 2015 on, projected)	2,500,000	2,500,000									
Investment Income	165,266	216,889	244,058	246,499	248,963	251,453	253,968	256,507	259,072	261,663	264,280
Total Endowment Fund Receipts	5,165,266	2,716,889	244,058	246,499	248,963	251,453	253,968	256,507	259,072	261,663	264,280
Uses											
Endowment Account Expenses	(3,000)	-	-	-	-	-	-	-	-	-	-
Annual Net Cash Flow (Endowment)	21,688,903	24,405,792	24,649,850	24,896,349	25,145,312	25,396,765	25,650,733	25,907,240	26,166,313	26,427,976	26,692,256

Tab E

Activities Update (Program, Events, Media)



Supporting the next generation of STEM & health care leaders

ACTIVITIES UPDATE | JUNE 2015

As summer approaches, the Washington State Opportunity Scholarship (WSOS) team is celebrating the selection of 1057 Cohort 4 Scholars who have been awarded scholarships in May, the graduation of over 500 additional Scholars this spring, the significant increase in STEM support programming, and the commitment of significant private contributions to help launch Washington's next generation of STEM and healthcare leaders.

The following provides a high-level summary of activities since the March 2015 WSOS Board meeting.

I. PROGRAMMING

SCHOLARSHIP SERVICES

In addition to overseeing a 36% increase in WSOS applicants and the selection of 1057 Scholars (up from 780 last year), the CSF Scholarship Services team has recently launched the 2015-16 renewal application and survey process. To date, 853 Scholars have completed or started the renewal application – a terrific result. We look forward to sharing the results of this survey at a subsequent WSOS Board meeting.

OFFICE HOURS

Campus partners across the state welcomed the launch of WSOS Office Hours. Sessions were launched to meet retention, placement and development goals through direct dialogue with Scholars statewide. Scholars at CWU, EWU, Gonzaga, PLU, UW, UWT, Whitworth, WWU and WSU attended “Cookies and Answers” sessions to address diverse questions. Scholar case management was documented in the WSOS database under five domains of need including Academics, Career, College, Community Building, Financial Aid and Personal (75 sessions documented since November 2014). Impact of the program will be assessed via the annual Scholar Survey tool.

SKILLS THAT SHINE: NAILING THE INTERVIEW

The second BCG/WSOS collaborative student workshop on interview techniques and strategies was held at the BCG Seattle office on April 24, 2015. The format included a panel discussing interviewing best practices, a presentation on how to prepare for an interview and hands on practice session with BCG, WSOS staff and other WSOS community supporters. All of the students had an opportunity to practice interviewing skills along with asking any questions they had about the process.

A survey was developed and the results were tabulated by the College Success Foundation's Research and Evaluation team (the full survey results as well as the slides from the program are attached). All students who participated in the workshop completed the pre- and post-surveys. In brief, the survey results indicated 73% of the students had not participated in an interview workshop or training in the past. They identified how best to communicate their personal strengths during an interview was their highest area of need. One hundred percent of the participants were either “very satisfied” (93%) or “somewhat satisfied” (7%) with the quality and utility of the workshop as well as the learning growth received from the workshop (100%). Ninety-three percent (93%) of participants indicated that they were “very likely” to implement the tools and/or practices covered in the workshop. Seventy-seven percent (77%) of the participants indicated implementing the practices or tools learned from the workshop.

Thirty days after the workshop, 87% of the students completed a follow-up survey. All students (100%) indicated a last efficacy of the workshop.

The WSOS staff, BCG and community volunteers were excited to not only help present this information to the WSOS students but also expressed having a wonderful time supporting and interacting with the students.

UNDERGRADUATE RESEARCH SYMPOSIA

Conducting research as an undergraduate is an important step towards successful placement in careers and post-baccalaureate studies. WSOS encouraged the participation of Scholars in their campus research offerings. Program staff recognized 95 Scholars who presented their findings at CWU, SPU, WSU, and UW symposia as well as the National Conference on Undergraduate Research this year hosted in Cheney at Eastern Washington University.

OTHER OUTREACH

Through bi-monthly e-newsletters and targeted communications, Scholars were invited to a variety of future-readiness opportunities and events such as Codess Seattle, Steampunk Techtacular. The Future Is Bright: Washington State Government Support for Health Care and Life Sciences Entrepreneurs, Google I/O, the Washington State Nursing Conference, New Tech Seattle, and the upcoming Annual National Society of Professional Engineers Conference.

Mahdi Ramadan (UW student and previous visitor to a WSOS board meeting) visited Sacred Heart Hospital in Spokane to meet with the engineers of the LVAD device which is at the center of his UW research – *“It was very inspiring to get to see and spend time with the patients with the LVAD, as they reminded me how important this research is and where the issues with the current system lies. It was a big city with a small town feel. Thank you all for coordinating this amazing experience for me, I am really honored to have had the opportunity to go.”* Thank you to Board member Mike Wilson for arranging this experience for Mahdi!

Finally, promotion activities are underway to attract applicants to the 2016 application cycle. WSOS met with teens and distributed collateral at Women Fly! (Museum of Flight), Kent Tech Expo, Spokane STEMposium, Washington FIRST Robotics, CWU College Assistance Migrant Program, TAF Senior Presentations, and Imagine Tomorrow.

II. DONOR CULTIVATION, FUNDRAISING EVENTS AND ADVOCACY

DONOR CULTIVATION AND FUNDRAISING EVENTS

In April, WSOS hosted its first donor cultivation event, Eat, Drink and Talk Tech, at the Four Seasons in Seattle. The event was co-hosted by Board members Brad Smith (EVP at Microsoft) and Jane Park (CEO of Julep) and in attendance were 50 tech industry CEOs, leaders, and WSOS Scholars. We will host a number of similar donor cultivation events this summer, fall and next spring focused on the engineering, aerospace, healthcare, and biomed industries. We will also host a cultivation event in Spokane.

In addition, on November 17, 2015 we will host our first large-scale fundraising event – OpportunityTalks. The breakfast event will feature our WSOS students as “TED-style” speakers. The honorary chair of the event is Former Governor Christine Gregoire and our two Co-Chairs are Kimberly Harris (CEO of Puget Sound Energy and WSOS Board member) and Mary Knell (CEO of Wells Fargo Washington and Western Canada). We are also recruiting a stellar group of Executive Leadership Committee (ELC) members for the breakfast. We have recruited 12 ELC members to date including CSF’s own Board Chair, Joe Gaffney.

Finally, the Opportunity Scholarship has been selected as this year’s beneficiary of GeekWire’s Geeks Give Back campaign, sponsored by Bank of America. The campaign has a combined goal of \$250,000 and will provide us with the opportunity for increased visibility among the tech and startup industries in Washington State.

III. MEDIA

Between March and June 2015, WSOS was featured in several print and broadcast outlets highlighting the program, awardees, and the Rubens Family Foundation grant.

Coverage Summary:

- » Editorial: Preparing students to compete in a high-tech job market
The Seattle Times | Apr. 7
- » Seattle angel investor Gary Rubens donates \$20M to Washington State scholarship program
GeekWire | Apr. 21
- » Woodinville investor gives \$20M to help 6,800 students get to college
The Seattle Times | Apr. 25
- » Woodinville investor gives \$20M to help 6,800 students get to college
KING5 | Apr. 26
- » Wash. Financier Gives \$20 Million to Scholarship Program
The Chronicle of Philanthropy | Apr. 27
- » Angel investor Gary Rubens wants successful founders to give back with new initiative
GeekWire | May 18
- » Microsoft's support for computer science education in Washington sees backing in signed House Bill 1813
Microsoft WinBeta | Jun. 11

SPECIAL FEATURE

Our partners at the Washington Technology Industry Association (WTIA) invited a WSOS graduate to write a guest blog post on their official blog. William Hall, Jr., a recent computer science graduate from University of Washington Tacoma, wrote an essay on his 'nontraditional' path to college, including transferring to the University of Washington Tacoma from a community college, receiving the WSOS, and how he took advantage of the network and opportunities our program offers.

An excerpt from William's essay:

"I had applied for and been awarded the Washington State Opportunity Scholarship. I didn't know it at the time, but being a part of WSOS turned out to be the most beneficial support system I could imagine.

This tremendous support system truly helped me to grow as a person and provided me with invaluable career tools. The student support staff within WSOS really encouraged me to do more with my time in school and step out of my comfort zone. The program allowed me to participate in professional development events and make valuable connections to professionals in my field and the greater tech community who offered me their time, feedback and encouragement. These opportunities for exposure and advancement outside of the classroom were truly life-changing and opened my eyes to the world."

SOCIAL MEDIA

Social engagement continues to grow rapidly and remains a key channel through which we communicate with students, community partners and the public.

Key social media growth and impressions Apr. 1-Jun. 12, 2015:

Facebook

- » 1,277 followers Apr. 1, 2015
- » 1,516 followers Jun. 12, 2015 **(+19%)**
- » Total impressions (paid & organic): **102,000**

Twitter

- » 877 followers Apr. 1, 2015
- » 975 followers Jun. 12, 2015 **(+11%)**
- » Total earned impressions: **26,000**



Microsoft's support for computer science education in Washington sees backing in signed House Bill 1813

Published: Thursday, June 11, 2015



The landscape of working environments will continually be in flux. From the Industrial Revolution to the Second Industrial Revolution, or more commonly known as the Technological Revolution, jobs were created, and jobs were replaced. To thrive in these fluctuating circumstances, it was incumbent upon parents, teachers, and universities to prepare an upcoming workforce with the trades, skills, and education to match the new changes. More recently, workspaces are relying more and more on the automation, software and service computers have to offer. However, very few of the students in large areas are being prepared or equipped with the education or technology to capitalize on these new opportunities.

Here in the North America, we hear of botched efforts to implement iPads in schools, or a rush to flood the educational system with low-cost Chromebooks, but these hardware initiatives are bandaids on a much larger wound. Students are gaining access to up-to-date technologies. However, it's the course material and educational legislation that will determine whether a child will be prepared for future in computer science, not the use of an iPad.

Over the past couple of years, Microsoft has been working with leaders from education, non-profits, and businesses in signing a letter of support for House Bill 1813. House Bill 1813 is intended to expand computer science classes across the state of Washington and provide new access to what is becoming foundational skills in Washington's economy according to Washington STEM. "We have 20,000 open computing jobs in the state right now and yet our state produces only 1,200 computer science graduates each year. Who is going to fill those jobs?" said Drew Hansen, D-Bainbridge Island. "We want every student in the state to have the opportunity to learn computer science so they will be ready for high-paying jobs in the state's technology industry." House Bill 1813 would also establish K-12 standards for computer science, creates K-12 computer science teaching endorsements and enables teachers to access state scholarships when pursuing computer science professional development. Incentivising teachers to actively seek out computer science as a career will hopefully translate to enthusiastic and creative courses for students.

Fortunately for future students, House Bill 1813 was signed today. The new law will now establish standards for computer science while matching private funding to train teachers to teach rigorous computer science courses. This investment is also expected to reach underrepresented students by prioritizing them first. As for Microsoft's involvement, the company is focusing on helping expand access to computer science in other ways. Among the various ways, Microsoft is prioritizing its



YouthSpark initiative that partners with non-profits to help provide STEM skills and opportunities to students. Microsoft will also be partnering alongside Code.org to jump start more engagement with computer science. Alongside Code.org and Youthspark, Microsoft will continue to support STEM education programs such as the Washington STEM, Washington State Opportunity Scholarship and Year Up.

Going a step further, Microsoft will continue offer its TEALS volunteer program (Technology Education and Literacy in Schools). The program is designed supplement computer science deficient schools and areas. To achieve this, TEALS recruit, train, mentor and place high tech professionals in high schools that are unable to meet the computer science needs on its own, according to Microsoft. With over 131 TEALS schools in North America and 500 current and former industry professionals, Microsoft estimates that the programs reach is somewhere near 6,600 students to date.

Not everyone is as optimistic about Microsoft's involvement understandably. Some have voiced concern over the conflict of interest involved with the state accepting the generosity of businesses like Microsoft or non-profit with agendas. There is an argument to be made, that learning opportunities will only be handed to students that are more likely to show a significant return on investment could result in only small groups receiving the full benefits of HB 1813. This level of disparity already exists in many tech-driven initiatives for schools where privileged schools receive newer hardware and technology while the vast majority of teachers, faculty and students remain unequipped and unprepared for the future. Whether or not the new law in Washington results in a similar divide has yet to be seen. However, some could argue that the shift in the conversation from hardware to training and education is at least a good first step.

Angel investor Gary Rubens wants successful founders to give back with new initiative

Published: Monday, May 18, 2015

When Seattle angel investor Gary Rubens meets with entrepreneurs, they often ask him about his foundation and how he uses his own money to support local non-profit programs.

“Over and over I hear entrepreneurs saying that they had always wanted to do something good and give back to society eventually,” Rubens said. Now, he’s created a way for them to do so.

Rubens this month launched a new program called the 1+1 Initiative that asks founders to give back 2 percent of their earnings from a successful exit, sale, merger, or buyout of their company.



The initiative requires founders to donate 1 percent to the Northwest Education Fund, a new 501(c)(3) that Rubens helped start with support from the Washington State Opportunity Scholarship and the College Success Foundation which provides college scholarships to underprivileged kids pursuing degrees in STEM (science, technology, engineering, mathematics) or healthcare.

The other 1 percent will go to another new program called the Northwest Startup Fund, a for-profit investment fund run by the 1+1 Initiative members that will back Northwest-based companies.

Rubens will also match any 2 percent pledge from a successful company or venture in which he is also invested.

“I thought that if I created a way for them to pledge to give back now and understand the long-term benefits to the local community, and if I made it easy for them to commit now, that this could be successful long-term,” Rubens explained.

There are already nearly 50 entrepreneurs that have joined, including CEOs like Kristin Smith and Josh Decker, to investors like Rudy Gadre.

Rubens is certainly familiar with giving back to the community. He’s invested in more than 70 local startups in the past two years and last month announced a \$20 million donation to the Washington State Opportunity Scholarship.

Rubens, a longtime Seattleite who sold a home furnishing and fixtures e-commerce site to Lowe’s in 2011, said he was inspired to start the initiative after seeing similar programs around the country and wanting to create one that was Northwest-focused.

He is covering the operational costs of both funds, but says that each entity will have a board of directors that is independent of him.

“My goal is to let the board directors run it,” Rubens said. “I provide the vehicle and let someone else drive.”

Wash. Financier Gives \$20 Million to Scholarship Program

Published: Monday, April 27, 2015

A Washington state tech investor has donated \$20 million to expand a state program that provides college scholarships for low-income students, reports [The Seattle Times](#). The gift from Gary Rubens benefits the Washington State Opportunity Scholarship, a public-private partnership established by former Gov. Chris Gregoire.

Launched with \$50 million from Microsoft and Boeing, the program has awarded 4,400 scholarships to date. Mr. Rubens' contribution will provide financial assistance to another 6,800 freshmen and sophomores over five years. The Woodinville, Wash., investor, who did not go to college himself, founded a home-improvement e-commerce site that was later acquired by hardware chain Lowe's. He is now an angel investor in tech start-ups.

The Seattle Times

Woodinville investor gives \$20M to help 6,800 students get to college

Published: Saturday, April 25, 2015

He never went to college himself, but he never doubted its impact to change lives.

Now Gary Rubens, a Woodinville investor, has given \$20 million to expand the reach of a college scholarship program to an additional 6,800 low-income Washington students.

Rubens, his wife, Jennifer, and the Rubens Family Foundation announced the gift this week. It will go to the Washington State Opportunity Scholarship, a public-private partnership. Under the terms of the scholarship, created in 2011, Washington state must match Rubens' donation, bringing the total amount to \$40 million.

The Opportunity Scholarship helps students who plan to major in science, technology, engineering, math or health care.

Rubens said he hoped his gift would inspire others to give to the scholarship fund. Set up by former Gov. Chris Gregoire with \$50 million in donations — \$25 million each from Microsoft and Boeing — the scholarship has been awarded to 4,400 students since its inception.

Rubens' gift will be given over five years to freshmen and sophomores, which serves as a challenge to the scholarship board to find more donors to keep the scholarship going when those students are juniors and seniors, said its executive director, Naria Santa Lucia.

In the past, more than half the scholarship's recipients have been first-generation college students, 60 percent have been female and more than half identified themselves as students of color, according to the scholarship board.

Rubens made money by launching a home-furnishing and fixtures e-commerce site that was later acquired by the big-box hardware chain Lowe's. After the sale, he became an angel investor in tech startups.

"What I lacked in education I made up for in tenacity," Rubens said. But he added, "I don't think I'm a good example of what happens to most people" if they don't go to college.

Santa Lucia said the scholarship board wants to encourage businesspeople who have made fortunes in tech fields to invest in education, so more low- and middle-income students can have those same opportunities. The legislation that created the scholarship requires the state to match contributions.

Students who win the award receive \$2,500 a year for the first two years of their education, \$5,000 in their junior year and \$7,500 in their senior year; if they study a fifth year, they can get an additional \$5,000.

The scholarships are structured that way because students in their junior and senior years are often doing internships or research, and can't work part time to help subsidize their education, Santa Lucia said.

She said students who are eligible for the scholarships have families with incomes up to the median household level in Washington — which is \$105,000 a year for a family of four. The grants are meant to reach at least some students who don't qualify for other financial aid because their family income is too high.

This is the second time in the last two years that the Rubens family has put money into scholarships. Last year, the family made a \$4.5 million gift for a separate program that assisted 180 low-income Washington students.

Seattle angel investor Gary Rubens donates \$20M to Washington State scholarship program

Published: Tuesday, April 21, 2015



Gary Rubens is already helping local startups get off the ground with financial backing. Now he's doing the same for students.

The Seattle angel investor today announced a five-year, \$20 million donation from his foundation to the Washington State Opportunity Scholarship (WSOS), a public-private initiative that funds college tuition for low- and middle-income students pursuing majors in science, technology, engineering and mathematics (STEM), and health care.

It's the largest gift from a single individual to the program since WSOS was founded in 2011, and the \$20 million will also be matched by the State of Washington. Thanks to the Rubens Family Foundation, WSOS will have another \$40 million to help put 6,800 students through a Washington state college or university.

"I grew up poor and did not have an opportunity to go to college because my family could not afford it, so I have a passion for those in need of an education," Rubens told GeekWire.

Rubens is a longtime Seattleite, first starting a manufacturing company in the hospitality industry and later launching a home furnishing and fixtures e-commerce site that was acquired by Lowe's in December 2011.

Now he invests in more than 50 local startups and is chairman of his foundation, which has given more than \$26 million to non-profits since 2013.

Rubens said he's passionate about helping the startup ecosystem grow in Seattle and said his WSOS donation will open doors for tomorrow's entrepreneurs — particularly those that may have not had the opportunity otherwise.



"These grants are specifically for underprivileged, low-income kids who are sometimes the first college attendee in their family," he said. "We literally want to break the cycle and change the course of a kid's life through education."

Since program administrative costs are already covered by initial program funds — Microsoft and Boeing are putting up \$50 million to help launch WSOS — every penny of Rubens' donation will go to scholarships.

“This investment is a perfect example of the promise of the Opportunity Scholarship,” Brad Smith, Microsoft General Counsel and WSOS Board Chair, said in a statement. “It’s impossible to overstate the impact to students who otherwise couldn’t attend college this fall.

The Rubens are also providing a great example for Washington’s business leadership,” Smith added. “Companies across the state are hungry for diverse, skilled talent and the Opportunity Scholarship can help Washington lead the nation in cultivating a robust workforce to support a thriving economy.”

WSOS has awarded 4,400 scholarships to eligible Washington-based students in families who earn up to 125 percent of the median family income.

The \$40 million will help double its impact, and the timing is good as the organization saw a 38 percent uptick in eligible applicants this year. WSOS noted that over half of its recipients are first-generation college students; 60 percent are female; and over half identify as students of color. Of graduates employed, 90 percent remained in Washington state.



Brad Smith

The Seattle Times

Editorial: Preparing students to compete in a high-tech job market

Published: Tuesday, April 7, 2015

Starting next fall, 10 high schools and three middle schools in Seattle will offer computer science courses ranging from exploratory to Advanced Placement classes. The courses will begin to address a growing problem: Washington businesses are creating jobs in science, technology, engineering and math fields, but the state is failing at preparing its students to seize those opportunities.

To close that gap, the state must invest more money and resources in expanding efforts already under way and look for smarter, long-term solutions to better prepare students entering the job market.

In 2013, employers in Washington had 20,000 unfilled openings in STEM fields such as computer science and health care, according to Boston Consulting Group (BCG) and Washington Roundtable, a public-policy organization.

Many of the state's fastest-growing and best-paid jobs are being filled by workers from other states or countries. Only 9 percent of children born in Washington end up working in STEM jobs, according to a 2014 BCG study. Students educated here deserve a better shot.

The 2014 study, "Opportunity for All," recommended that Washington double the number of students graduating from state colleges and universities with STEM degrees, which requires a sustained effort and significant investment to hire and add classroom and lab space.

The K-12 system also needs a path to train teachers in computer science, which doesn't exist right now, said Mary Davison, a career and technical-education program manager for Seattle Public Schools.

Another solution, in use in some schools, is to recruit industry professionals to co-teach with a certified teacher. Employers should encourage workers to partner with schools to help teach as well as expose students to STEM careers.

The state Senate should pass SHB 1813, a bill that would set standards for teaching computer science and match state dollars with private funding to train teachers. The bill sailed through the House 91-7.

State lawmakers should also boost funding to the Washington State Opportunity Scholarship, which gives scholarships using public and private dollars to college students majoring in STEM fields. Budget proposals from Democrats and Republicans include more funding for the program.

Code Fellows, a Seattle-based school offering intensive courses in computer programming, has churned out about 400 graduates since launching in 2013. The school boasts that more than 80 percent of its graduates land jobs within three months.

Still, CEO Kristin Smith said the school's graduates are a "drop in the bucket" in terms of meeting demand. More companies and organizations need workers with technical skills such as government agencies and health-care providers — not just the Microsofts and Amazons of the world.

Washington's STEM education needs an overhaul, but that starts with expanding effective innovations. The state's homegrown students should be taking a much bigger slice of the employment pie.

Find Scholarships Across the U.S. to Support Low-Income Students

Published: Thursday, February 19, 2015

Financing a college education and keeping debt under control can seem like a daunting task. For students from low-income families, it can seem nearly impossible.

If your family struggles to make ends meet, income-based scholarships can provide necessary financial resources and are a great place to start when planning for your education future.

Most need-based scholarships are awarded at a local or regional level, so investigate the opportunities available to you in your own state or community. For example, if you live in the Houston area, consider applying to the George and Mary Josephine Hamman Foundation. The undergraduate scholarship provides \$18,000 over four years for up to 70 high school seniors who plan to attend any four-year college or university in the U.S.

Out east, high school seniors from North Carolina can benefit from a generous four-year scholarship totaling up to \$12,000, or up to \$9,000 for those transferring from a community college, from the Golden Leaf Foundation. In addition, students who are attending two-year colleges can apply for a scholarship worth up to \$750 per semester. The deadline for the four-year scholarship is March 1. If you're interested in applying for the two-year college scholarship, contact your institution's financial aid office.



Over on the other side of the country, Washington students in their last year of high school through their sophomore year of college are eligible for the Washington State Opportunity Scholarship. This award is designed to assist low- and middle-income in-state students pursuing a science, technology, engineering, math or healthcare-related field.

With individual awards worth up to \$7,500 and 700 new scholarships being provided for the upcoming year, this is an excellent resource for qualifying students. The application is open through March 2.

For students in the southern region of the U.S., the Watson-Brown Foundation provides both need- and merit-based scholarships to university students in parts of Georgia and South Carolina. More than 800 students benefit from these renewable scholarships to the tune of \$3,000 and \$5,000 each year. Although the application closed earlier this month, make sure to check back next year and apply.

If you reside in Arizona, the Arizona Community Foundation makes the scholarship search easier by offering access to more than 80 different funding sources with one application. Students with financial

need, disabilities or those raised in foster care can supplement the cost of education. Deadlines for these scholarships vary, with many expiring in late February and March, so apply sooner rather than later.

The Bailey Family Foundation offers scholarships for Florida students who demonstrate financial need. High school scholarship awards of \$5,000 are offered and renewable for up to four years. A one-time award of \$5,000 is also offered for college students. The foundation is accepting applications now through March 15.

The Hawaii Community Foundation also has a variety of scholarships available that take financial need into consideration. Some need-based scholarships do have GPA requirements or other application criteria, so look at the frequently-asked questions section to help clarify your eligibility. The deadline for this program is today, so apply now for your chance at free money.

Lastly, low-income students from around the country who put themselves through college with one or more jobs can find recognition with a scholarship from the Erickson Merkel Foundation. The 2015 Jerome P. Merkel Scholarship will reward the top three hardworking college students with funding in the amounts of \$3,000, \$2,000 and \$1,000. Applications are due Feb. 28, so start working on your essays now.

Many scholarships have deadlines in the spring for the following academic year. Now is the time to start researching scholarships and planning your budget. Use a calendar to keep track of application deadlines and plan out your time wisely. Advanced preparation can pay off and make your goal of higher education attainable.



WSOS Interview Workshop

April 24, 2015

Introduction

Welcome – 10 minutes

Panel conversation: Interviewing best practices – 10 minutes

How to prepare for your best possible interview – 20 minutes

Breakout Workshop – 60 minutes

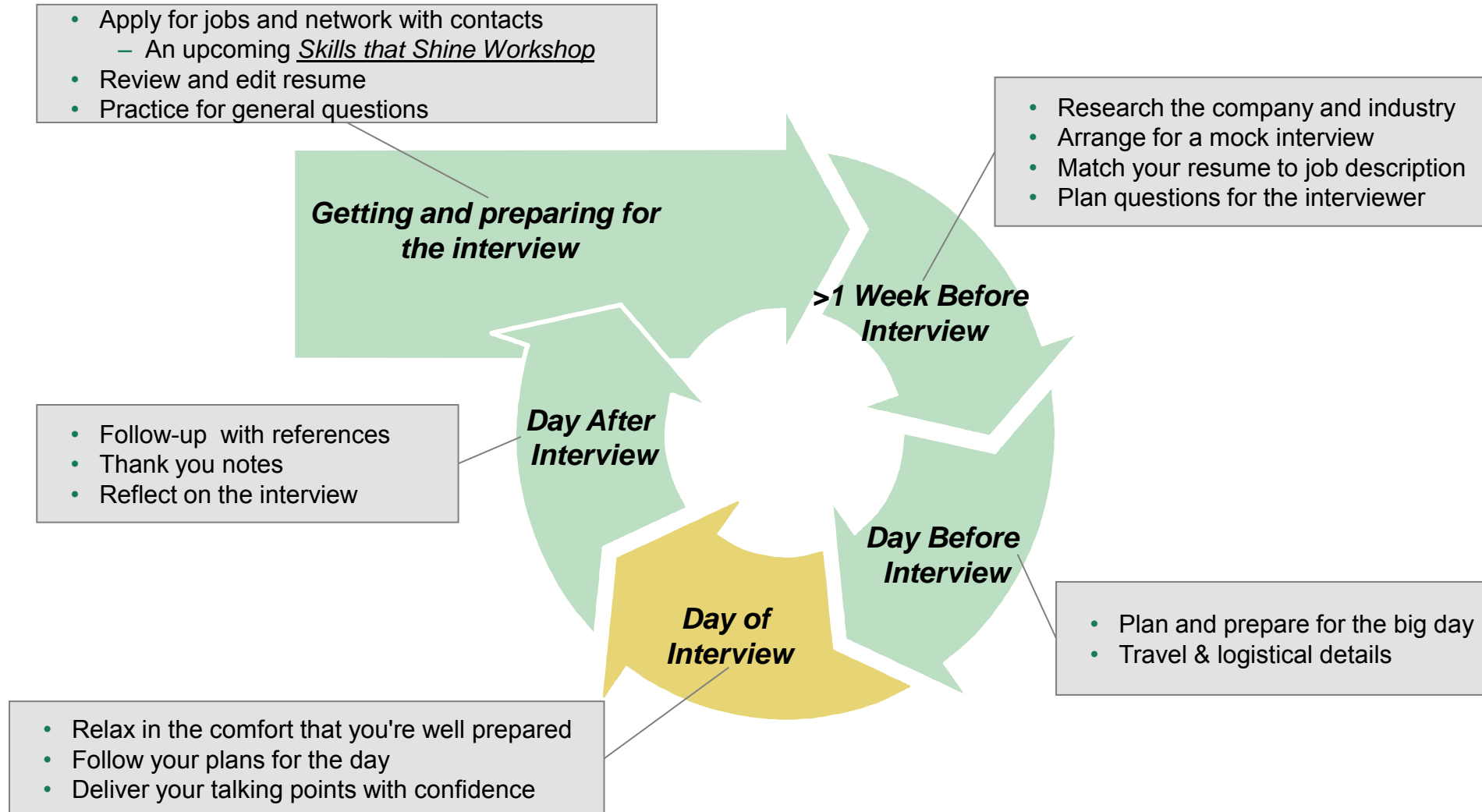
Welcome from Naria Santa Lucia



Naria Santa Lucia
Executive Director, Washington State Opportunity Scholarship

Think about interviewing as a cycle

Whether next week or in 5 years, it will repeat



Before you have an interview scheduled

Applications, networking and general interview preparation



Objective

Prepare for everything that you won't have time to do a week before your interview, including references, general interview questions, industry knowledge etc...

Major Activity Checklist



Create your list of potential references

- Who can provide insight into your skills and abilities?
- Who will provide a reference for your character?
- Most important: Ask these people if they are willing and able to give you a good reference!



Prepare for general questions everyone faces in every interview

- Review and fill out the strengths worksheet
- Prepare your stories in the STAR format

Bonus section tips/tricks

Research the industry and jobs that interest you

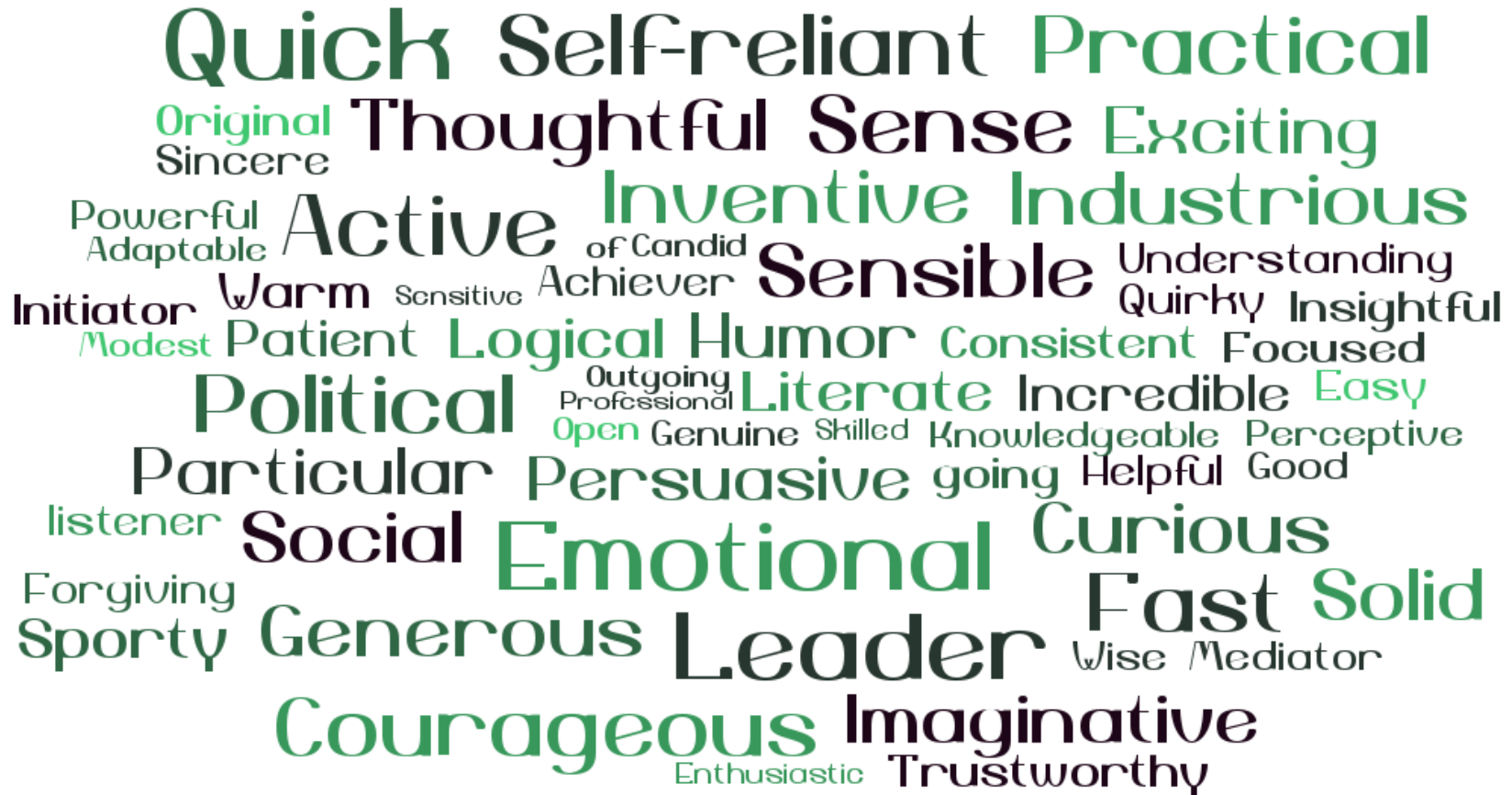
- What are they looking for in employees?
- What kind of jobs do college grads get?
- Sources of information are everywhere
 - Friends and family in the industry
 - Professors, faculty and career service

Practice your answers to sample questions

- Find a family member to give you feedback on your answers
- Practice delivering answers into the mirror, or record yourself and listen to your answers
- Be mindful of rambling responses
 - Best case: just lose the interviewer's interest
 - Worst case: lose your train of thought



Strengths: what do you want to communicate?



Choose 3 strengths that you want to highlight

What are your key strengths and when have you demonstrated them?



Key Strength

1 Attention to detail

2

3

Brainstorm situations where you demonstrated your strength

Don't all have to be from resume

Coding videos in
psychology laboratory

Tracking organization
funds as treasurer

Communicate your strengths using the STAR method



Situation

Start describing the situation you faced and your role: *the Who, Where, When?*

- This is a where you will set up the plot of your story for your interviewer
- It is important to make this as brief as possible so they don't lose interest

Task

Summarize the task you had to accomplish: *the Why?*

- Define your goal, desired outcome or the challenge that you faced
- This should contain a hurdle or challenge to over come

Action

Describe the actions you took to accomplish the task: *the What?*

- Describe what happened and how you attacked the problem
- Illustrating the actions you took is critical to demonstrating your value

Results

Close your answer with the results of your actions

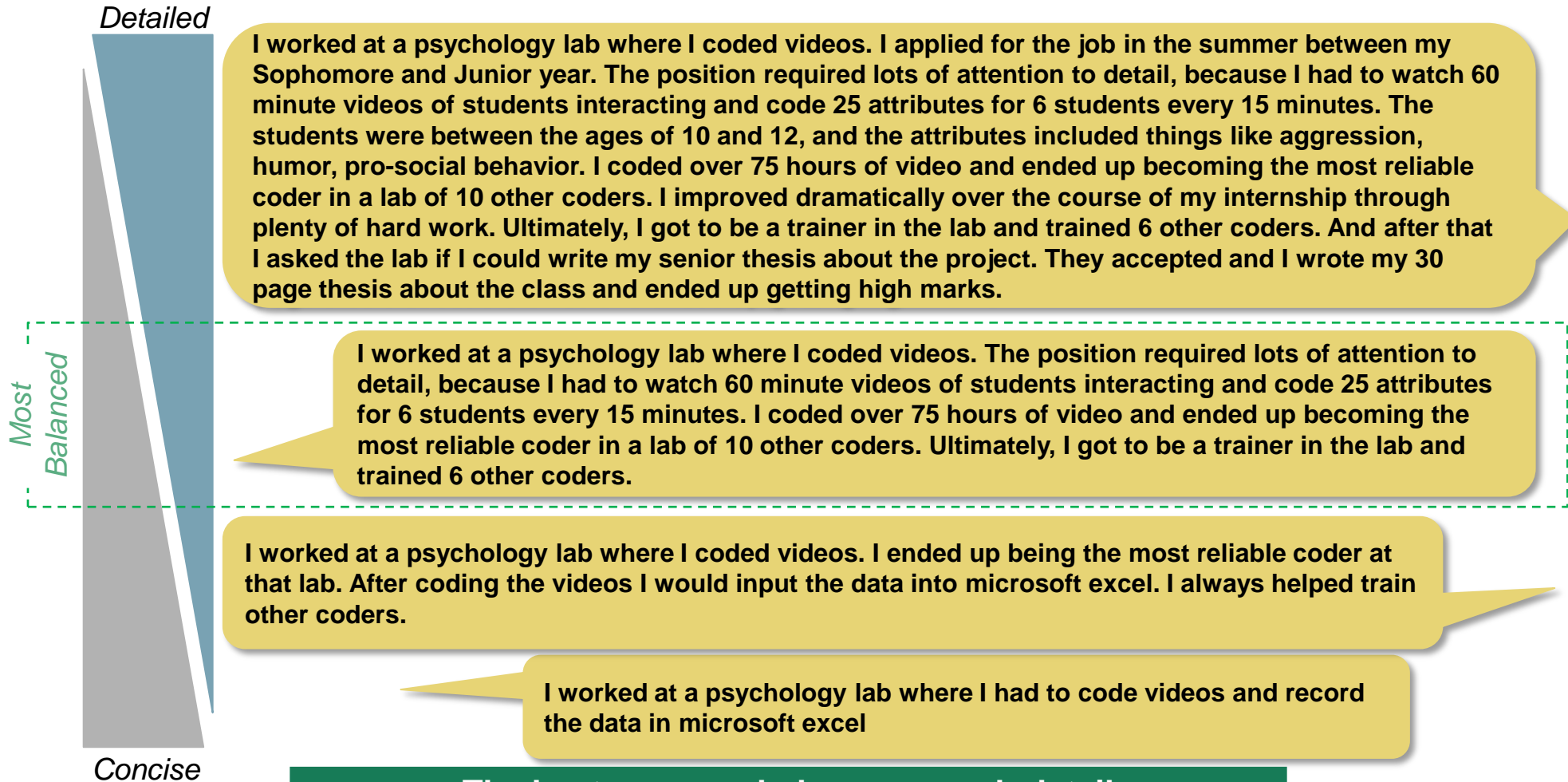
- Be specific and quantify the results, if possible
- The more specific you are, the more convinced the interviewer will be you are the person for the job



Reframe the earlier situations stories into STAR stories

	1	2	3
Situation	Coding videos in a psychology lab		
Task	Consistently code 25 attributes for 6 students over an hour long video		
Action	Practiced coding diligently, reaching over 75 hours of video coded		
Results	Was promoted to coding trainer in lab		

"Tell me about a project that you worked on that illustrates your attention to detail"...



The best answers balance enough detail with a concise delivery

Sample questions for interview preparation

How many of your anecdotes apply to these situations



Organizational Skills

Tell me about a project that you worked on that illustrates your attention to detail.

Tell me about a time when planning ahead benefited you.

Tell me about a situation when you took on additional responsibilities or a new role?

Problem Solving

What is the most difficult decision that you have had to make? What alternatives did you consider?

Describe a situation when it took you multiple attempts to reach a goal.

You have prior experience in ____. What do you think would be your biggest challenge here?

Communication Skills

Tell me about yourself.

Tell me about a time when you worked with a difficult customer or supervisor. What did you do?

Can you talk about a really important presentation or communication that you've had?

Interpersonal Skills

Tell me about _____ position on your resume.

Tell me about a time when you had to adapt your style for a particular situation. How did it work?

What is the best team you have worked with and why do you define this as a great team?

How would you answer these questions?

Once you have an interview scheduled

Focus on company and job specific preparation



Objective

Now that you know where the interview is and what the job will be, prepare for the questions and interview details that are relevant to specific job and company

Major Activity Checklist



Pre-wire your references

- Select the references that are most appropriate for the job and company
- Let them know about the interview
 - Date, company, job description
 - Skills and experiences you think will be relevant



Know your resume



Clothes and appearance

- Is it time for a hair cut?
- Do you have a professional outfit that is clean and ready?

Bonus section tips/tricks

Do your homework: research the company and make sure know all of the critical details

- Shows that you're interested in the company
- Allows you to tailor your interview responses
- Ensures that you think you'll be a good fit

Come with a list of questions about the company and job

- What information couldn't you find out from your research? What would you like to know more about?

Come up with five reasons why you're a great candidate for that specific job

- Create your STAR stories that demonstrate those attributes

Company research

By answering these questions, you be more knowledable the company and job



- How does the company/organization fund their operations? Do they sell something, or are they funded by government grants? Are they for-profit or non-profit?
- What activities do they perform to create their products? Do they import, manufacture, design, program, train, provide a service, etc?
- How does the job you're applying for fit into that chain of events? Are you helping them design a better product, maintain quality, help customers?
- How did the company begin? Who was the founder? Have they always been involved in the same business, or is this a new venture for them?
- Where is the company located? Do they have other locations for manufacturing, engineering, sales?
- Has the company been in the news lately? What happened, and what is their perspective?

Try to answer to these questions before the interview

The day before the interview

Set yourself up for success



Objective

Now that you're prepared for any interview questions that come your way, make sure the day of the interview will go well, and that you're prepared for anything new that comes your way

Major Activity Checklist



Plan your transport logistics

- Where and when is the interview?
 - Address, building name, room number, time
- When are you leaving and how are you getting there?
 - Do you have a back up plan?
 - Are you planning for delays?



Plan your outfit

- Clean, professional, appropriate



Go to bed early and sleep well

Bonus section tips/tricks

Do a dry run to simulate the interview day

- Get up at the planned time and get ready as you normally would
- Try on your interview clothes and spend some time wearing them around
 - How do they fit and feel?
 - Are you going to be comfortable traveling to the interview in them?
- Have a friend or family member give you a mock interview
- Practice delivering your talking points

The day of the interview

You're well prepared, now you just need to get there and deliver



Objective

Get to the interview on time, relaxed, and prepared to deliver your best interview possible. Remember first impressions are formed very quickly, so come appropriately dressed and groomed.

Major Activity Checklist

- ✓ **Start the day right for you**
 - Eat a good breakfast
 - Caffeinate – if normal, no jitters
- ✓ **Plan to leave early**
 - And then leave 30 minutes earlier
 - Don't mess up the interview by not getting there on time!
- ✓ **Things to bring and review**
 - Copies of your resume
 - Also, in case they didn't print
 - STAR worksheets – Know your story
 - Company research
 - Pen and paper to take notes

Bonus section tips/tricks

- Consider your odors, both natural and unnatural**
- Be sure to shower before the interview...
 - ... But resist the urge to wear perfume or cologne
 - Many people find these smells offensive, and they can be overpowering in a small enclosed interviewing space

After the interview

Follow up with everyone involved and reflect on what worked



Objective

Demonstrate that you're a reliable, contentious candidate that appreciates the opportunity to interview and is still interested in the job

Major Activity Checklist



Follow up with references

- How the interview went
- Any particular talking points you want them to highlight



Send a thank you to the interviewer(s)

- Hand written is best
- E-mail at a minimum
- Be specific, highlight something you discussed

Bonus section tips/tricks

Reflect on how the interview went

- What worked?
 - Make sure to do it again next time!
- What didn't work?
 - Create a plan for improving on this next time

Consider reaching out to the interviewer for feedback

- Some feedback will be incredibly helpful

Final burning questions

Questions

Do I have to wear a suit to the interview?

- Generally depends on the company
- Rule of thumb is to dress a couple of levels above the office dress code

Other tips

Be prepared to talk about ANYTHING you put on your resume

Make sure you review your resume for 10 minutes before each interview

Put your best foot forward: you don't need to tell them everything about yourself, but you can't make ANYTHING up

Any other questions?!

Overview for Panelists and Breakout Teams

Breakout Instructions

Activity	Suggested Time	Desired Output
1 Brainstorm strengths and situations where the student demonstrated them	10 minutes	<ul style="list-style-type: none">• 3 strengths to highlight• A story/situation that demonstrates each
2 Break each of the stories up into the STAR format, ensuring the student highlights the critical elements in each area	20 minutes	<ul style="list-style-type: none">• STAR worksheet filled out for each story
3 Practice delivering the stories, and in particular adapting each of the stories to a new question	15 minutes	<ul style="list-style-type: none">• Student ready to deliver answers in a concise statement that addresses the question
4 Move into a mock interview setting, where you ask the student a few questions in a simulated interview	15 minutes	<ul style="list-style-type: none">• Students get a taste of a mock interview

Panelist Overview

Overview

Thank you for agreeing to take part in our panel discussion!

The panel is a highlight of the *Skills that Shine Workshop*, and will be critical for demonstrating the importance of interview preparation and for getting the participants excited about the session

We ask that you spend some time before the session thinking about the following questions and preparing some talking points that would assist college graduates in their interview prep

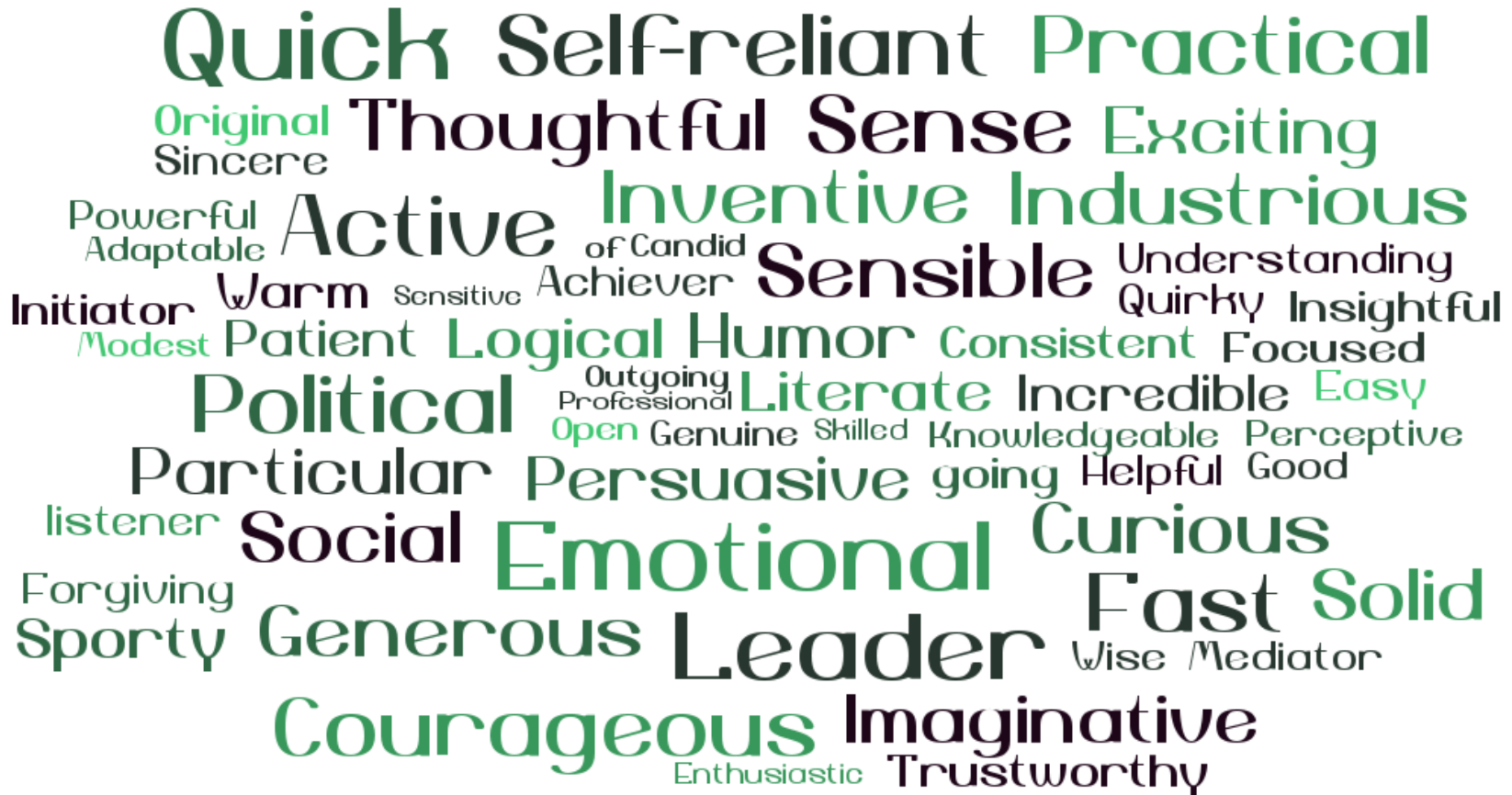
Sample Questions

- What is the first thing you notice about an interviewee, and how does it influence the rest of the interview?
- What is the biggest mistake you've seen someone make (or better, made yourself) in an interview?
- What is the difference between a good response and a great response to a question?
- For technical positions, how do you make a decision between two candidates that both have proven technical abilities to perform the work?

Handouts For Printing



Strengths: what do you want to communicate?



Choose 3 strengths that you want to highlight

What are your key strengths and when have you demonstrated them?



Key Strength

1

2

3

**Brainstorm
situations
where you
demonstrated
your strength**

**Don't all have to
be from resume**

Communicate your strengths using the STAR method



Situation

Start describing the situation you faced and your role: *the Who, Where, When?*

- This is a where you will set up the plot of your story for your interviewer
- It is important to make this as brief as possible so they don't lose interest

Task

Summarize the task you had to accomplish: *the Why?*

- Define your goal, desired outcome or the challenge that you faced
- This should contain a hurdle or challenge to over come

Action

Describe the actions you took to accomplish the task: *the What?*

- Describe what happened and how you attacked the problem
- Illustrating the actions you took is critical to demonstrating your value

Results

Close your answer with the results of your actions

- Be specific and quantify the results, if possible
- The more specific you are, the more convinced the interviewer will be you are the person for the job

Reframe the earlier situations stories into STAR stories



1

2

3

Situation

Task

Action

Results

	1	2	3
Situation			
Task			
Action			
Results			



WSOS & Boston Consulting Group Interview Workshop Report

Delivered to Naria Santa Lucia

Washington State Opportunity Scholarship

June 12, 2015

Kimber Connors, Research and Evaluation Officer
CSF Research, Evaluation, Planning & Accountability

Overview

On April 24, 2015, the Boston Consulting Group (BCG) and the Washington State Opportunity Scholarship (WSOS) team delivered an interview workshop to 15 WSOS Scholars in the Seattle office of BCG. In total, 15 participants completed the pre- and post-assessments and 13 (87%) completed a thirty-day follow-up survey. This report summarizes baseline data, training satisfaction and utility, learning growth and actual implementation of workshop tools thirty days later.

Baseline Understanding, Knowledge, Tools & Practices

- Responses indicate that prior to this workshop, 50% of participants had never before participated in a mock interview and 73% had never previously attended a workshop or training related to interviewing strategies. Previous inexperience with mock interviews or trainings coupled with Scholars' baseline responses on the pre-survey indicate moderate to high need in all content areas of the workshop:
 - 80% of participants indicated that they understood how to best communicate about their strengths in an interview "to a small extent" or "not at all" (73% and 7%, respectively). The baseline responses suggest that understanding how to best communicate strengths was the area of highest need.
 - 67% indicated they understood which questions are appropriate to ask in an interview "to a small extent" or "not at all" (47% and 20%, respectively).
 - 53% of participants indicated that that they understood how to best prepare for an interview "to a small extent." None of the participants reported their understanding of preparing for an interview as "not at all."
 - 27% of participants indicated that they understood what to expect in an interview "to a small extent." None of the participants reported their understanding of what to expect in an interview as "not at all."
- On average, participants rated their knowledge, tools and/or practices to thoroughly prepare for an interview as "moderate," with a mean score of 3.86 on a 7-point scale with 1 indicating "to a great extent," 4 "to a moderate extent" and 7 "not at all." This rating also suggests a moderate to high need among participants for this workshop content.

High Immediate Workshop Satisfaction & Utility

- Participants reported strong immediate satisfaction with the workshop's quality and utility:
 - 100% of respondents indicated that they were "very satisfied" or "somewhat satisfied" overall with the workshop (93% and 7%, respectively).
 - 100% indicated that they were "very satisfied" or "somewhat satisfied" with the quality of the resources and tools provided (93% and 7%, respectively).

WSOS & Boston Consulting Group Interview Workshop Report

- 100% indicated that they were “very satisfied” or “somewhat satisfied” with the quality of the presentation (80% and 20%, respectively).
- 100% indicated that the training was “very useful” or “somewhat useful” (93% and 7%, respectively).

Strong Learning Growth

- Survey responses indicate strong learning gains from this workshop:
 - 100% of participants indicated learning growth in terms of their necessary knowledge, tools and/or practices to thoroughly prepare for an interview.
 - 93% of participants indicated learning growth in terms of their understanding of how to best prepare for an interview, how to best communicate about strengths in an interview, and which questions are appropriate to ask in an interview.
 - 53% of respondents indicated learning growth in terms of their understanding of what to expect in an interview. Given that approximately half of participants did not experience learning growth in this area, additional emphasis on what to expect in an interview may be appropriate for future trainings. However, it is worth noting that 67% of participants indicated in the pre-survey that they understood what to expect in an interview “to a moderate extent.” Given the relatively high levels of reported understanding on this point prior to the workshop, it is possible that the lack of learning gains is more a reflection of the relative understanding of this topic prior to the training rather than a lack of emphasis on this point during the training.

High Likelihood for Implementation

- Participant responses suggest a high likelihood for implementation:
 - 93% indicated they were “very likely” or “somewhat likely” to share the knowledge, tools and/or practices covered in the training with a peer.
 - 93% of participants indicated that they were “very likely” to implement the tools and/or practices covered in the training. None of the participants reported that they are “somewhat likely” to implement the tools and/or practices covered in the training.
 - 80% indicated they were “very likely” or “somewhat likely” to follow up with a peer or colleague from the training.

Moderate to High Actual Implementation

- Thirty days after the training, participants reported moderate to high implementation:
 - 77% had implemented the tools and/or practices covered in the workshop “to a moderate extent” or “to a great extent” (31% and 46%, respectively).
 - 77% had shared the knowledge, tools and/or practices covered with a peer “to a moderate extent” or “to a great extent” (46% and 31%, respectively).

WSOS & Boston Consulting Group Interview Workshop Report

- 54% of participants indicated they followed up with a WSOS Scholar from the workshop “to a moderate extent” or “to a great extent” (31% and 23%, respectively).
- 46% indicated that they followed up with a facilitator or professional from the workshop “to a moderate extent” or “to a great extent” (31% and 15%, respectively).
- Since attending the workshop, nearly one-quarter had participated in a mock interview and nearly one-quarter had interviewed for a job.

High Enduring Training Utility

- Thirty days after the training, 100% of respondents indicated that it was “very useful” or “somewhat useful” (93% and 7%, respectively). This finding is identical to immediate training utility, suggesting a high level of training lasting efficacy.
- In the thirty-day follow-up, one respondent included comments for improvement. S/he indicated that it would have been useful to have been able to follow-up with his/her partner at the workshop. S/he suggested that this formal follow-up include submitting written responses to sample interview questions and receiving feedback for his/her improvement.

Tab F

Finance Update



Supporting the next generation of STEM & health care leaders

INVESTMENT & FINANCE COMMITTEE TELEPHONIC MEETING MINUTES | TUESDAY, MARCH 10, 2015

Members Present: Mack Hogans, Peter Harvey, Bob Moser, George Zinn
Others Present: Naria Santa Lucia, Paul Kruglik, Karyl Gregory

Mack Hogans, Committee Chair, called the meeting to order at 1:02 PM and did a roll call of meeting participants, establishing a quorum. .

Peter Harvey moved and Bob Moser seconded the approval of the minutes of the December 16, 2014 Washington State Opportunity Scholarship (WSOS) Investment and Finance Committee meeting, and the motion carried.

Financial / WSIB Investment Update

Paul Kruglik, interim Chief Financial Officer (CFO) for the College Success Foundation (CSF, WSOS program administrator), provided an update on WSOS' finances and investments.

First, Kruglik reviewed the balance sheet and income statement as of January 31, 2015, highlighting that \$5M was received from Boeing in December 2014. Kruglik noted that revenue and operating expenses are tracking under budget, whereas scholarship payments are currently over budget. He reported that expenses are below budget because WSOS currently has a number of staff positions that have not yet been filled. He also reported that scholarship payments are slightly over budget, but we expect to track more closely on target as we examine more data on attrition rates, etc.

After discussion and review of the balance sheet and income statement, Hogans requested that future financial reports clearly separate the private and public investment returns being managed by the Washington State Investment Board (WSIB). He also requested that CSF provide committee members with original copies of the WSIB Investment quarterly reports as soon as possible after they are received. Hogans also requested that all WSOS budget forecasted revenue and assumptions be reviewed and validated by Kruglik and Naria Santa Lucia, WSOS Executive Director, before they are booked. Kruglik reported that Santa Lucia will work together on developing the FY16 budget using assumptions from past performance. Finally, Hogans requested, and the committee agreed, that the financial statements should compare the quarter over quarter, six months over six months and year over year.

Next, Kruglik reported on the cash flow. He noted that the cash projection for January to the end of the year tracks almost exactly to what was presented at the December committee meeting. Kruglik stated that we still anticipate \$1M in cash liquidity by December 2015. The committee discussed an appropriate cash balance and supported maintaining \$1M in the operating account.

Bob Moser recommended moving funds currently invested with Oppenheimer to US Bank to reduce administrative overhead for staff. The committee agreed with this suggestion.



Supporting the next generation of STEM & health care leaders

George Zinn asked if WSIB immediately invests WSOS funds as soon as they are received. Hogans reported that this question has been raised with the WSIB account manager and was advised that their policies allow them to choose the timing of an investment based on their best judgment. Hogans advised that if the committee wants WSIB to be more time specific, then it would require another level of the committee's involvement.

Kruglik reviewed the WSIB Quarterly Report – December 31, 2014.

Harvey noted that the report reflects one basis point below world index and fixed income lagged the index by a wider margin. The committee surmised that WSIB probably put the money to work later. Hogans asked Kruglik to raise this question with WSIB and report to the committee. .

Legislative Update

Hogans provided an update on the formal legal opinion request to the Attorney General's Office. Hogans reported that he spoke to Dave Stolier who indicated that the Attorney General's Office has not yet decided if public funds can be invested in equities. There is no time table for this decision.

New Vice Chair of the Committee

Hogans reminded the committee that with Terry Gillespie's departure from the committee, a new member is needed and a new vice chair should be appointed. Bob Moser moved and George Zinn seconded the motion to appoint Peter Harvey as new vice chair. The motion carried.

The meeting adjourned and the committee went into Executive Session at 1:50 pm.

Respectfully submitted,
Mack Hogans



**Washington State
Investment Board**

**WSOS Investment and Finance Committee
Portfolio Review
June 24, 2015**



Allyson Tucker, CFA – Senior Investment Officer



Overview of the Washington State Investment Board (WSIB)

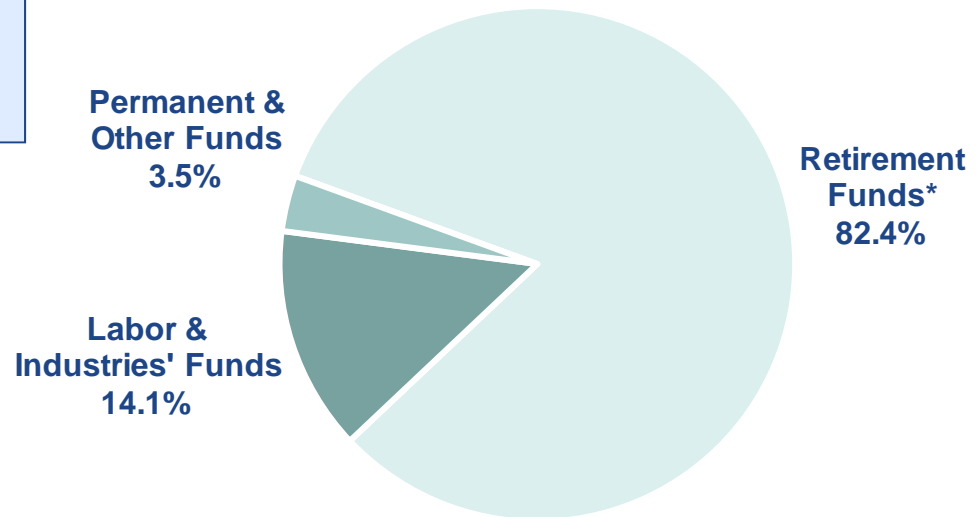


The WSIB invests on behalf of 35 funds

- ▣ 17 Retirement Funds
- ▣ 5 State Insurance Funds
- ▣ 13 Permanent and Other Trust Funds

**Assets Managed by the WSIB
as of April 30, 2015
\$107.7 Billion**

Washington State Opportunity Scholarship program falls under the Permanent and Other Trust Funds



*Defined Benefit Fund, Defined Contribution Funds, and Higher Education Retirement Plan



WSIB Governance Structure



Board comprised of 15 members has investment authority

- ▣ 10 voting – represent system stakeholders
- ▣ 5 investment professionals (non-voting) – selected by voting members for their investment expertise

	Appointment Authority	Name	Position
10 Voting	Ex-Officio	James McIntire	State Treasurer
		Marcie Frost, Chair	Director, DRS
		Joel Sacks	Director, Labor & Industries
	Senate President	Mike Hewitt	State Senator
		House Speaker	Timm Ormsby
	Governor	Judy Kuschel	Active Member, PERS
		George Masten	Retired Member, PERS
		Kelly Fox, Vice Chair	Active Member, LEOFF
	Superintendent of Public Instruction	Arlista Holman	Active Member, SERS
		Stephen Miller	Active Member, TRS
5 Investment Professionals	Selected by the Board	Robert Nakahara	
		Jeffrey Seely	
		David Nierenberg	
		William Longbrake	
		Richard Muhlebach	



Overview of the Washington State Opportunity Scholarship Program (WSOS)

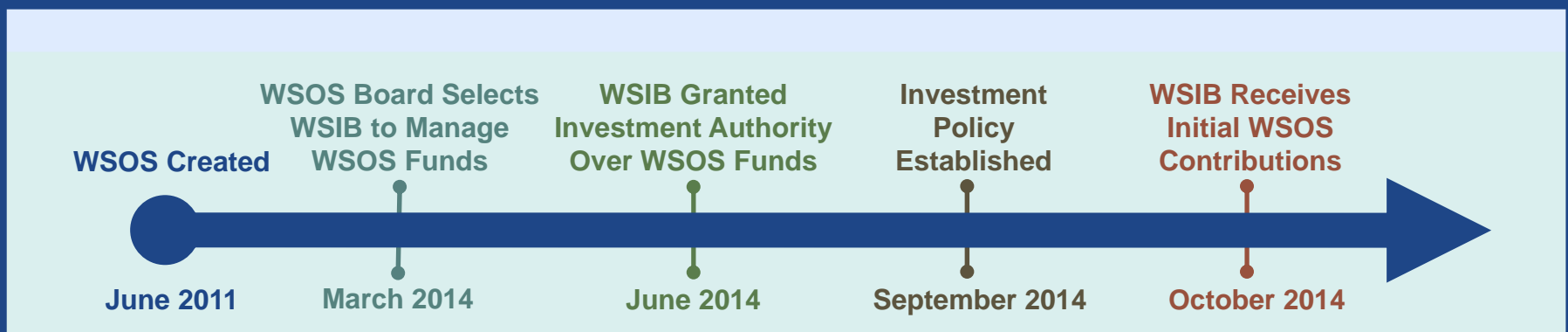


The WSOS was created by the Legislature in 2011. The WSOS board selected the WSIB to invest on its behalf in March 2014

Investment Objectives

- Maintain the financial stability of the program
- Ensure sufficient assets are available to fund the scholarship goals of the program over a 10-year time horizon
- Subject to one and two above, manage the assets to maximize return at a prudent level of risk
- Invest in a manner that will not compromise public confidence in the program

Time Line





Early Growth of WSOS Funds



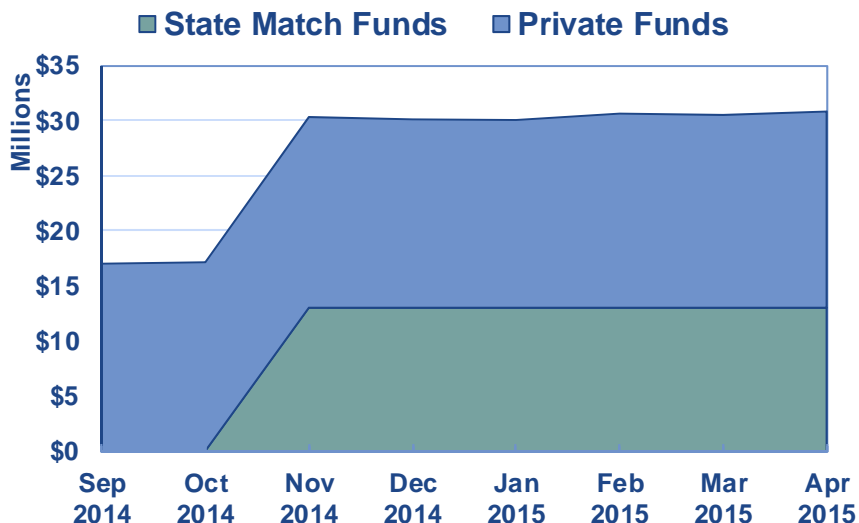
Scholarship Account

- Total assets as of April 30, 2015, were \$30.8 million, comprised of 58% private funds and 42% state match funds

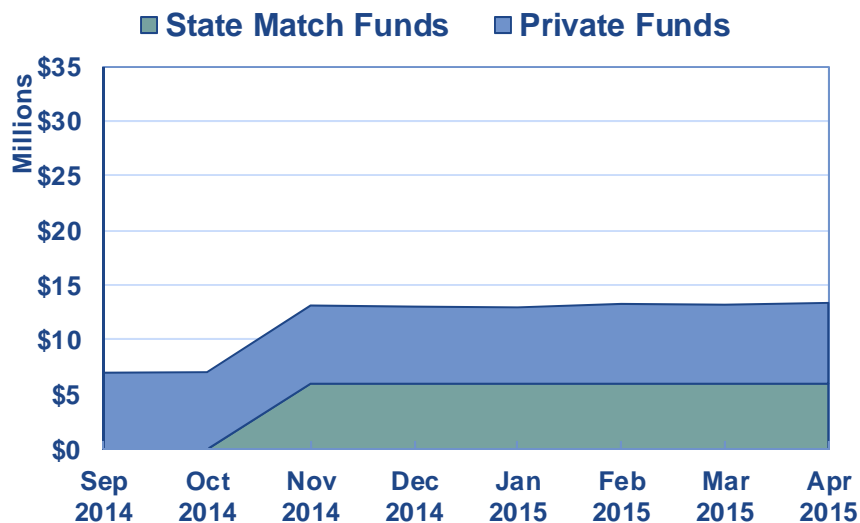
Endowment Account

- Total assets as of April 30, 2015, were \$13.4 million, comprised of 55% private funds and 45% state match funds

Growth of Scholarship Account Assets



Growth of Endowment Account Assets



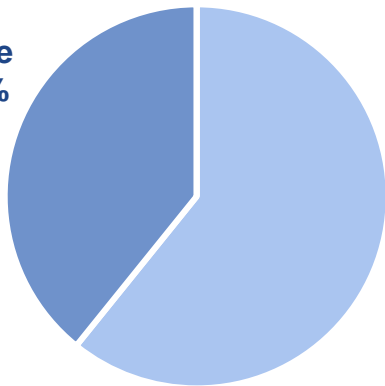


WSOS Scholarship Account – Private Funds

April 30, 2015 Allocation

Market Value \$17,813,669

Fixed Income
39.20%



Equity
60.80%

Current Targets

	Target	Range
Cash	0%	0% - 5%
Public Equity	60%	55% - 65%
Fixed Income	40%	35% - 45%

The Equity portfolio is passively managed by State Street Global Advisors and is expected to closely track the MSCI All Country World Investable Market Index

The Fixed Income portfolio is actively managed by WSIB staff and is expected to meet or exceed the Barclays U.S. Intermediate Credit Index

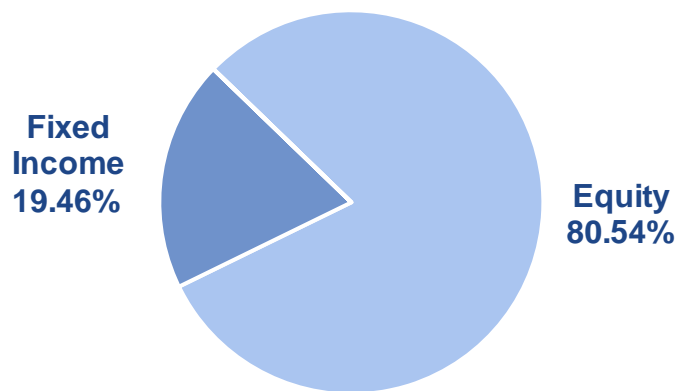
The Cash portfolio is invested in a money market fund managed by BlackRock



WSOS Endowment Account – Private Funds

April 30, 2015 Allocation

Market Value \$7,382,908



The Equity portfolio is passively managed by State Street Global Advisors and is expected to closely track the MSCI All Country World Investable Market Index

The Fixed Income portfolio is actively managed by WSIB staff and is expected to meet or exceed the Barclays U.S. Intermediate Credit Index

The Cash portfolio is invested in a money market fund managed by BlackRock

Current Targets

	Target	Range
Cash	0%	0% - 5%
Public Equity	80%	75% - 85%
Fixed Income	20%	15% - 25%



WSOS Scholarship and Endowment Accounts – State Match Funds

April 30, 2015

Scholarship Market Value	\$13,001,458
Endowment Market Value	\$6,000,673

State match funds are held in cash

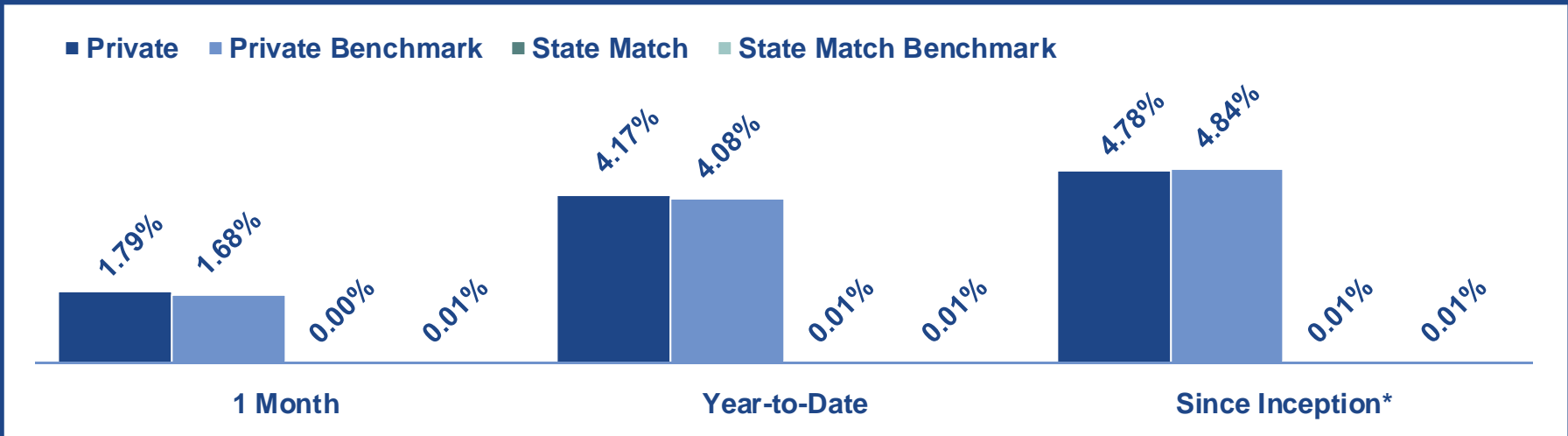
Both the target and current allocation are 100% cash

The cash portfolios are invested in a money market fund managed by BlackRock

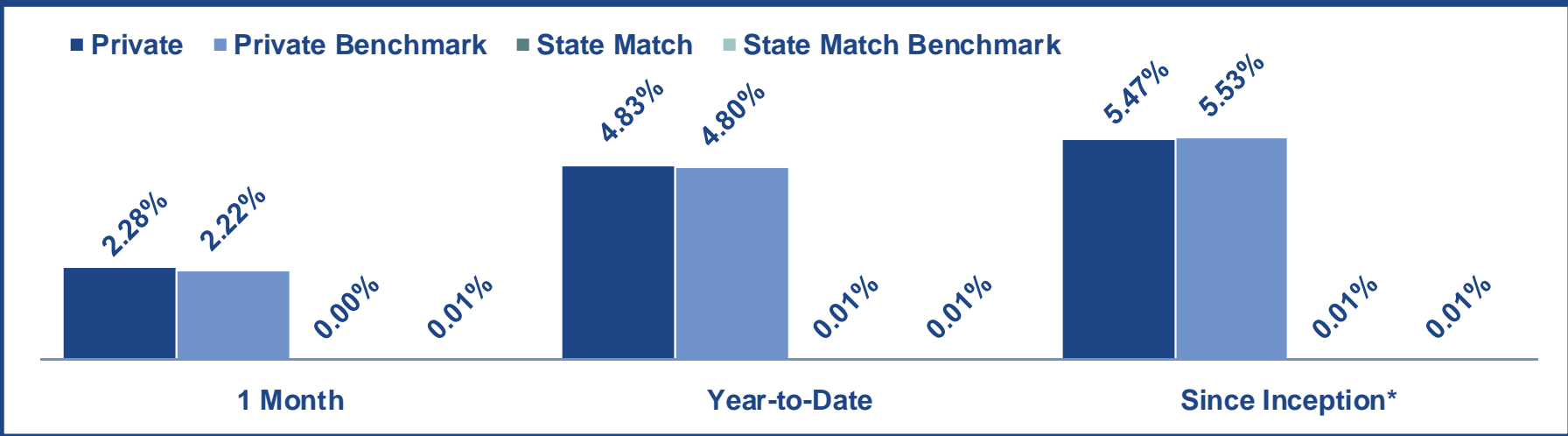


Early Account Returns – April 30, 2015

Private and State Match Scholarship



Private and State Match Endowment



Scholarship Benchmarks: Private 60% MSCI ACWI IMI w/U.S. Gross & 40% Barclays Intermediate Credit, State Match 90 Day T-bill
 Endowment Benchmarks: Private 80% MSCI ACWI IMI w/U.S. Gross & 20% Barclays Intermediate Credit, State Match 90 Day T-bill
 * Since Inception: Private 10/1/14, State Match 11/25/14



WSIB Fund Performance Compared to Market Indices

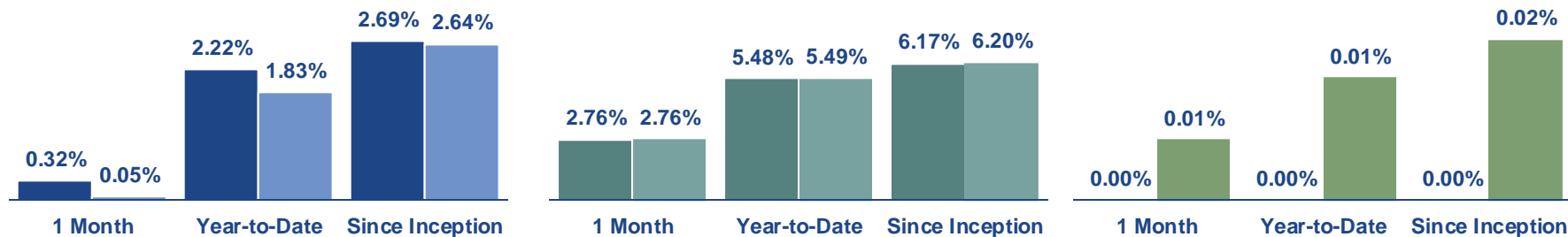


Short time period for performance evaluation

Asset class performance is within expectations

More relative performance differences in fixed income than equity accounts due to active strategy

April 30, 2015



WSIB Fixed Income vs. Barclays Intermediate Credit

WSIB Global Equity vs. MSCI ACWI IMI w/ U.S. Gross

Cash vs. 90 day T-Bill



Contact Information



Web Site: <http://www.sib.wa.gov>

Address: 2100 Evergreen Park Drive SW
P.O. Box 40916
Olympia, WA 98504-0916

Phone Number: (360) 956-4600

INVESTMENT & FINANCE COMMITTEE REPORT

June 24, 2015

WSOS Balance Sheet



Supporting the next generation of STEM & health care leaders

Comparison to FYE

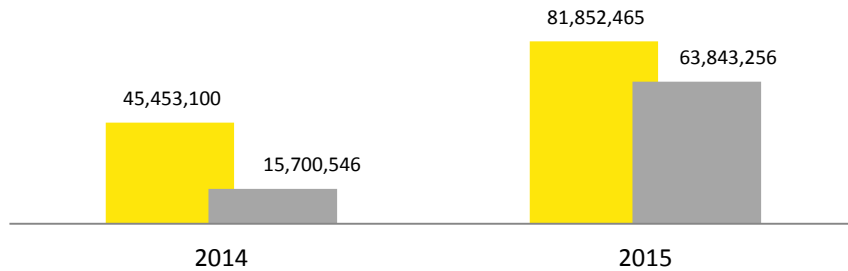
Comparison to same period LFY

	Comparison to FYE			Comparison to same period LFY		
	6/30/14	% Change	5/31/15	5/31/14	% Change	5/31/15
<u>Assets</u>						
Cash	1,357,640	103%	2,754,512	1,248,180	121%	2,754,512
Investments	28,163,081	71%	48,151,632	23,158,274	108%	48,151,632
Pledges Receivable	15,932,379	94%	30,946,321	21,113,672	47%	30,946,321
Total Assets	45,453,100	80%	81,852,465	45,520,126	80%	81,852,465
<u>Liabilities and Net Assets</u>						
Accounts Payable	354,277	-45%	196,047	651,184	-70%	196,047
Scholarship Commitments	29,398,277	-39%	17,813,162	28,380,708	-37%	17,813,162
Total Liabilities	29,752,554	-39%	18,009,209	29,031,892	-38%	18,009,209
Total Net Assets	15,700,546	307%	63,843,256	16,488,234	287%	63,843,256
Total Liabilities and Net Assets	45,453,100	80%	81,852,465	45,520,126	80%	81,852,465

WSOS Balance Sheet

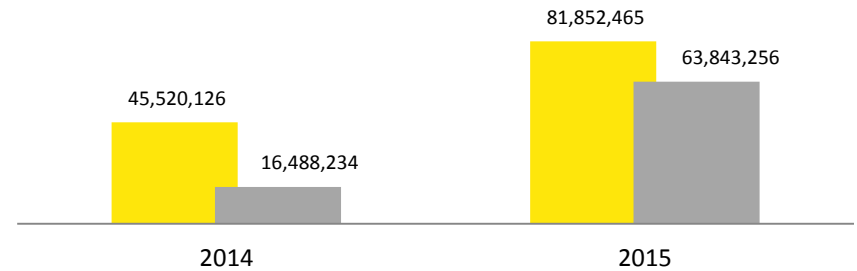
Comparison to FYE
6.30.14 and 5.31.15

■ Assets ■ Net Assets



Comparison to FYE
5.31.14 and 5.31.15

■ Assets ■ Net Assets



WSOS Income Statement



Supporting the next generation of STEM & health care leaders

	Eleven Months Ended May 31, 2015			FYE June 30, 2015
	Actual	Budget	Variance Fav (Unfav)	Annual Budget
<u>Revenue</u>				
Private	20,924,105	9,166,667	11,757,438	10,000,000
Public	25,000,000	25,000,000	-	25,000,000
Investment Income	731,681	727,782	3,899	793,944
Total Revenue	46,655,786	34,894,449	11,761,338	35,793,944
<u>Expense</u>				
Scholarship	8,791,284	10,667,731	1,876,448	11,637,525
Salaries and Benefits	404,360	663,679	259,318	724,013
Program Other Direct	337,508	256,207	(81,301)	279,499
Allocated Indirect Overhead	-	131,368	131,368	143,311
Professional Fees (CSF)	565,039	741,784	176,745	809,219
Total Expense	10,098,191	12,460,770	2,362,578	13,593,567

WSOS Cash Flow

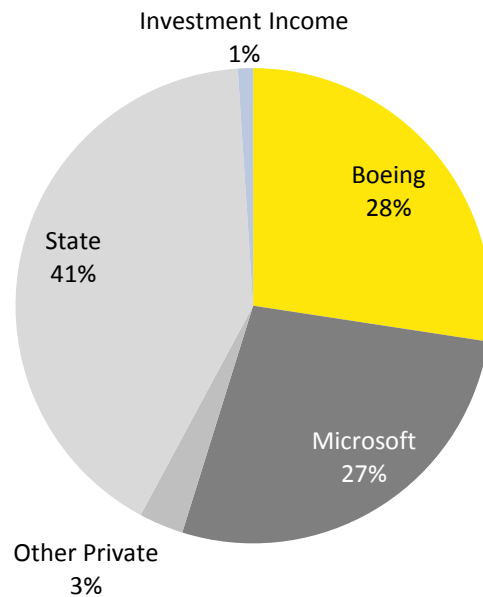


Supporting the next generation of STEM & health care leaders

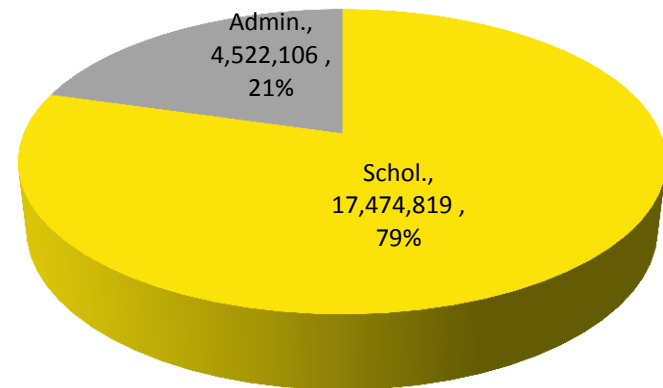
	Inception - May 31, 2015		
	<u>Scholarship</u>	<u>Endowment</u>	<u>Total</u>
<u>CASH FLOW</u>			
Cash Inflows:			
Boeing	10,000,000	10,000,000	20,000,000
Microsoft	20,000,000	-	20,000,000
Other Private	1,740,433	470,764	2,211,197
State	24,000,000	6,000,000	30,000,000
Investment Income	520,417	233,442	753,859
Total Cash Inflows	56,260,850	16,704,206	72,965,056
Cash Outflows:			
Scholarships	(17,474,819)	-	(17,474,819)
Program Administrator and Marketing	(4,522,106)	201	(4,521,704)
Total Cash Outflows	(21,996,925)	201	(21,996,523)
Net Cash Flow Inception-To-Date & Balance of Cash & Investments November 30, 2014			
	34,263,925 -	16,704,407 -	50,968,533

WSOS Cash Flow

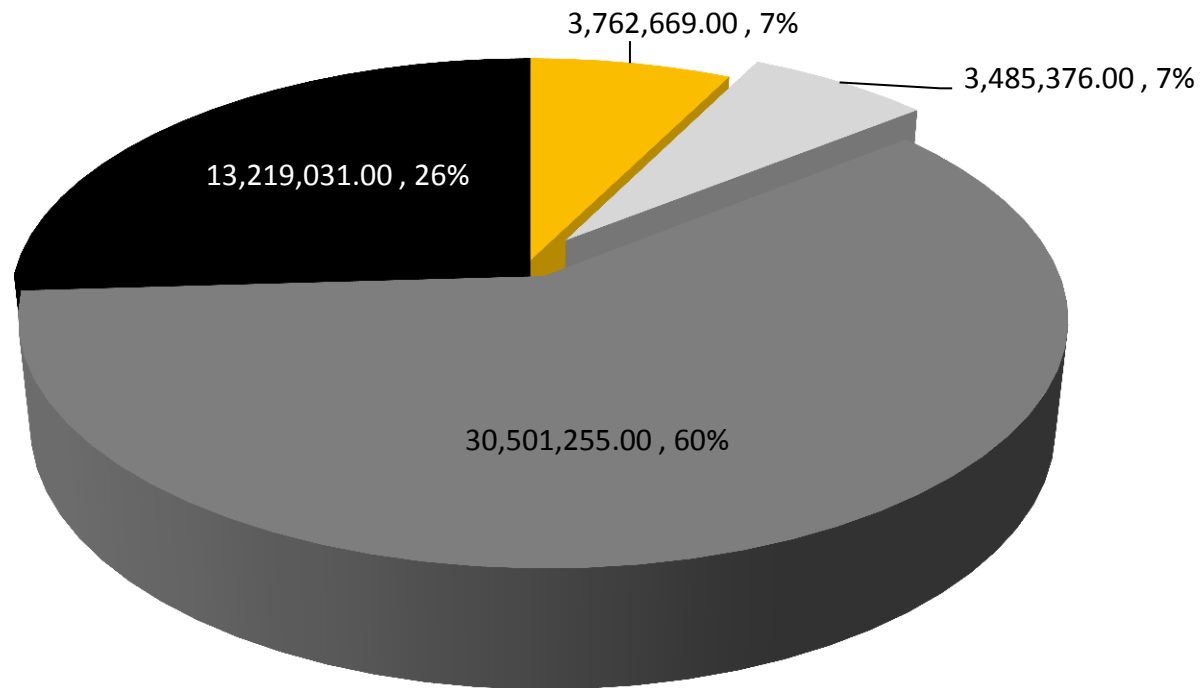
Inflows
Inception through May 31, 2015



Outflows
Inception through May 31, 2014



Distribution of Funds



■ US Bank / Oppenheimer ■ Oppenheimer Endowment ■ WSIB Scholarship Program ■ WSIB Endowment Program

WSIB REVIEW

June 24, 2015

WSIB Highlights

Scholarship Fund

- \$30,501,255 under management
- 39.77% allocated to fixed income vehicles
- 60.23% allocated to equity funds
- 2.34% and 2.36% returns respectively (quarter)
- 2.93% and 3.11% inception to date return

Endowment Fund

- \$13,219,030 under management
- 19.84% allocated to fixed income vehicles
- 80.16% allocated to equity funds
- 2.49% and 2.52% returns respectively (quarter)
- 3.12% and 3.24% inception to date return

WSIB Performance

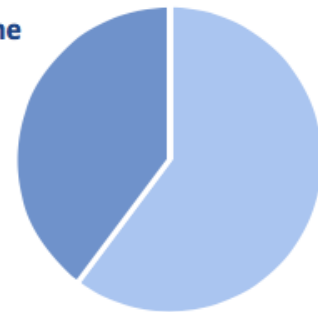
WSOS Quarter Ended March 31, 2015

Private and State Match Scholarship

Private	
Total	\$17,500,050
Equity	\$10,539,421
Fixed Income	\$6,960,605
Cash	\$24

State Match	
Total	\$13,001,205
Cash	\$13,001,205

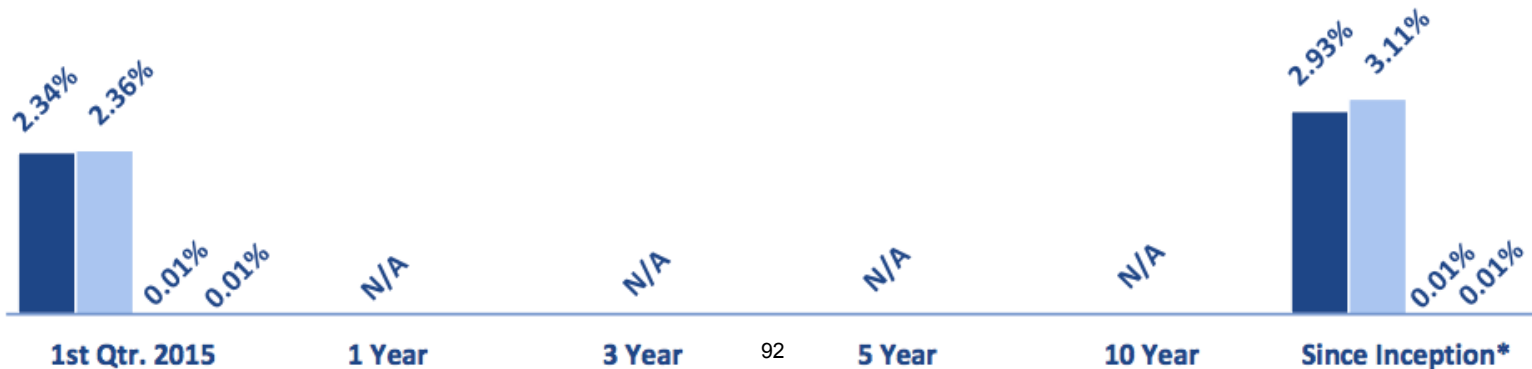
Fixed Income
39.77%



Private Allocation

Equity
60.23%

■ Private ■ Private Benchmark ■ State Match ■ State Match Benchmark



WSIB Performance

Private and State Match Endowment

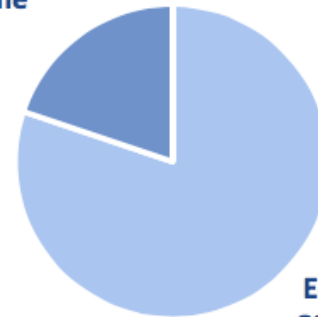
Private	
Total	\$7,218,474

Equity	\$5,786,349
Fixed Income	\$1,432,103
Cash	\$23

State Match	
Total	\$6,000,556

Cash	\$6,000,556
------	-------------

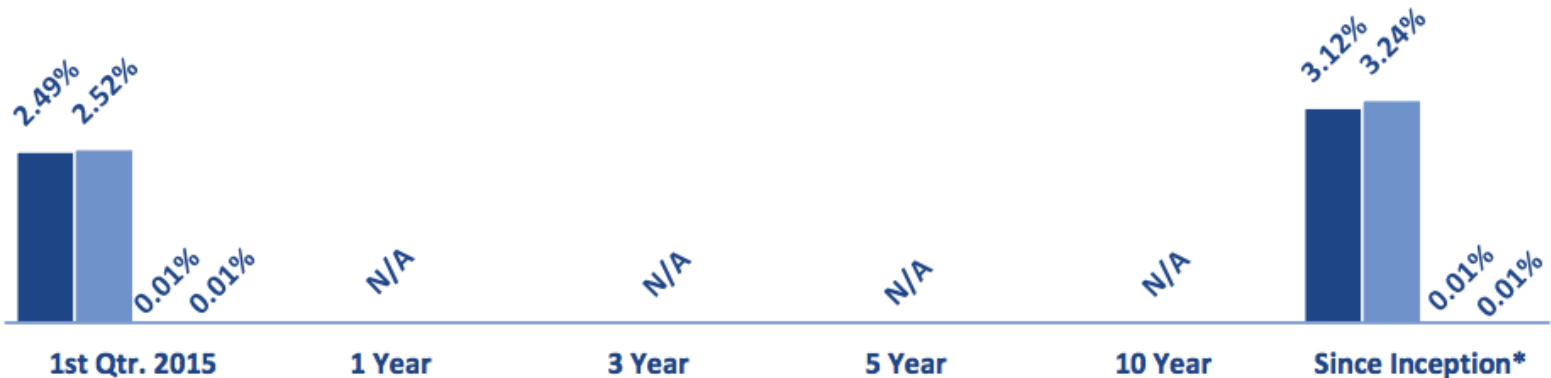
Fixed Income
19.84%



Equity
80.16%

Private Allocation

■ Private ■ Private Benchmark ■ State Match ■ State Match Benchmark

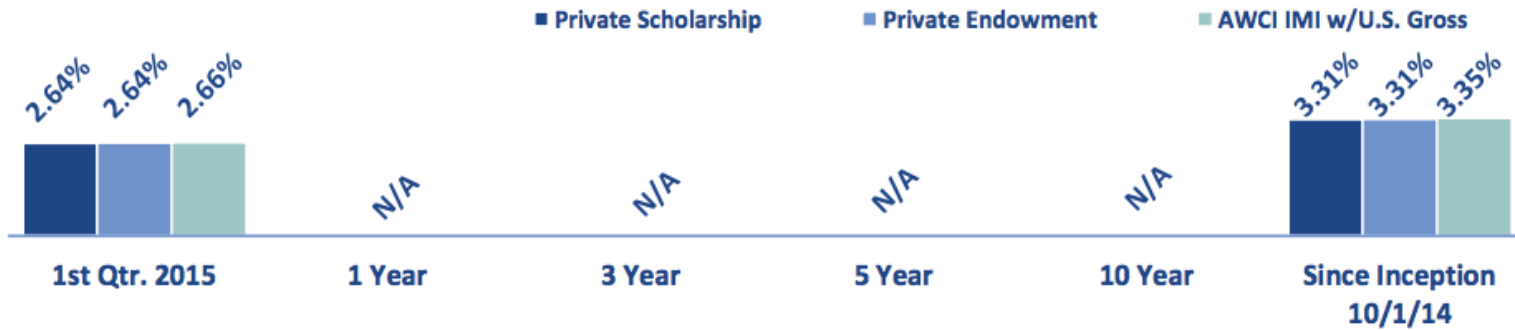


WSIB Performance

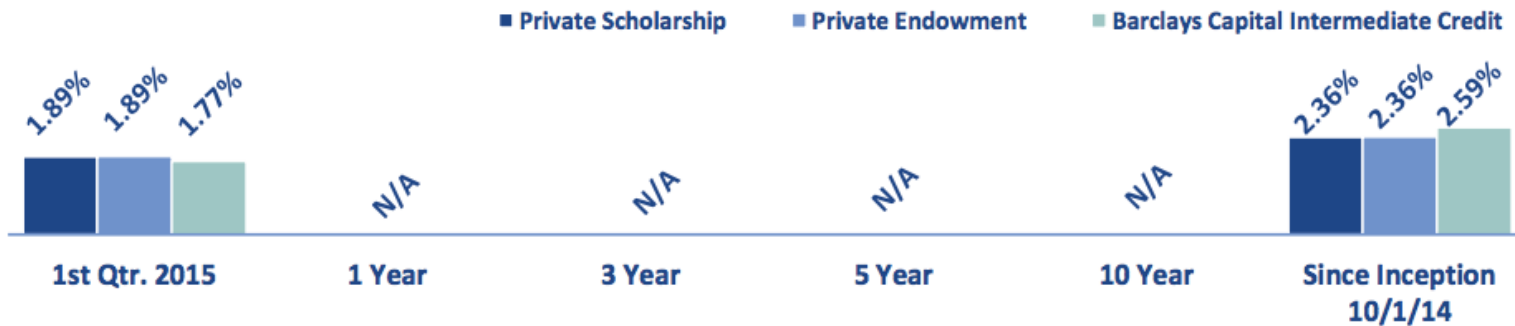


Supporting the next generation of STEM & health care leaders

Equity Returns



Fixed Income Returns



Cash Returns

■ Private Scholarship ■ Private Endowment ■ 90 Day Tbill

Tab G

Presentation of FY16 Work Plan and FY16 Program Administrator Scope of Work & Key Deliverables

Contract No. _____
Contract for Professional Services
between the
State of Washington
Washington Student Achievement Council
and
Washington State Opportunity Scholarship Board
and
College Success Foundation

This Contract is made and entered into by and between the State of Washington, Washington Student Achievement Council, hereinafter referred to as "WSAC," and the Washington State Opportunity Scholarship Board, hereinafter referred to as "WSOS BOARD"; and the College Success Foundation, hereinafter referred to as "CSF."

College Success Foundation

1605 NW Sammamish Rd, Suite 200

Issaquah, WA 98027

Phone: 425-416-2000

FAX: (425)416-2001

Email: pkruqlik@collegesuccessfoundation.org

Federal TIN: 20-5561911

WA State UBI Number: 602-027-399

PURPOSE

The purpose of this contract is to perform the duties prescribed under Ch. 28B.145 RCW as enacted by the 2011 Washington Legislature by passing the Washington State Opportunity Scholarship (WSOS) Act (Chapter 13, 2011 Laws 1st Special Session) to assist low-income and middle-income students and invest in high employer demand programs, and as amended by the 2014 Legislature (Chapter 208, 2014 Laws). The WSOS BOARD was created with members appointed by the Governor to provide oversight and guidance for the Washington State Opportunity Scholarship and Opportunity Expansion programs. CSF shall act as the WSOS Program Administrator, shall staff the WSOS BOARD, and shall manage the WSOS program. WSAC shall manage the opportunity scholarship match transfer account. This contract establishes the responsibilities for each of the three parties in the administration of the Opportunity Scholarship and Opportunity Expansion programs.

The WSOS Program Administrator is defined in RCW 28B.145.010 as "a college scholarship organization that is a private nonprofit corporation registered under Title 24 RCW and qualified as a tax-exempt entity under section 501(c)(3) of the federal internal revenue code, with expertise in managing scholarships and college advising." CSF is a nonprofit scholarship organization devoted to improving higher education opportunities for underserved students in Washington through early college awareness, mentoring, advising, and scholarships.

The work related to the administration of the Opportunity Scholarship and Opportunity Expansion programs by the CSF will be overseen by the WSOS BOARD which will determine the administrative fee for the WSOS Administrator.

APPOINTMENT/TERMINATION

The WSOS BOARD and WSAC hereby engage and retain CSF as WSOS Program Administrator (WSOS Administrator) to perform the services described herein. The appointment may be terminated by the WSOS BOARD, with or without cause, upon 90 days' notice to CSF. CSF may resign with or without cause at any time upon 90 days' notice to the WSOS BOARD and WSAC.

SCOPE OF WORK

WSOS BOARD

The WSOS BOARD provides oversight and guidance for the Washington State Opportunity Scholarship and Washington State Opportunity Expansion programs as outlined in Ch. 28B.145 RCW. Primary responsibilities include:

1. Determine the administrative structure and fees to CSF as the WSOS Administrator.
2. Solicit funds and set annual fund-raising goals for both the scholarship account and the endowment account with support from CSF. Goals should include:
 - a. Maintaining a robust scholarship program.
 - b. Maximizing private sector contributions to both accounts.
 - c. Considering the needs for a long-term funding mechanism while balancing the needs of current students.
3. Determine eligible programs of study leading to bachelor's degrees that scholarship recipients must pursue to receive scholarship funding.
4. Provide general program guidance and ensure the fulfillment of duties and responsibilities assigned to CSF as the Program Administrator.
5. Determine, with the assistance of CSF, the division of funds between the scholarship and endowment accounts in the case of undesignated grants and contributions.
6. Report to the Governor, WSAC, and Higher Education Legislative committees regarding the WSOS program including:
 - a. The selected education programs for the scholarships.
 - b. The number of scholarship applicants and participants and their demographic information.
 - c. The number and amount of scholarships awarded and from which account they were paid.
 - d. The institutions and education programs in which participants enrolled.
 - e. The total amount of private contributions and state matching funds, how funds were distributed between the scholarship and endowment accounts, including investment income and administrative fee paid to CSF.

7. Ensure that principal and income held in the WSOS Account and income from the Opportunity Endowment Account is used to cover the cost of scholarships disbursed and administrative fee.
8. Select institutions of higher education to receive opportunity expansion awards as provided in RCW 288.145.060.
9. Comply with all applicable state laws and rules including but not limited to the open public meetings act (Ch. 42.30 RCW), ethics in public service (Ch. 42.52 RCW), public records act (Ch. 42.56.RCW), and state budgeting, accounting and reporting system (Ch. 43.88 RCW).

CSF

CSF, serving as the WSOS Administrator, shall staff WSOS as directed by the WSOS BOARD and perform the duties and responsibilities as outlined in the statute to manage the scholarship fund and expansion fund accounts and administer the scholarship program. Primary responsibilities include:

1. Provide administrative support to the WSOS BOARD and staff.
2. Manage the opportunity scholarship fund accounts.
 - a. Establish and manage two separate investment accounts: the Opportunity Scholarship Account and the Opportunity Endowment Account to receive grants and contributions from private sources and state matching funds and to disburse scholarship awards.
 - i. Manage the Scholarship and Endowment Accounts to achieve the maximum rate of return on the investment accounts in accordance with the prudent investor standard and the Uniform Prudent Management of Institutional Funds Act (UPMIFA), RCW 24.55.
 - ii. Ensure that for each dollar of state matching funds authorized by WSAC and received under RCW 28B.145.050, an equivalent amount is spent directly on the Opportunity Scholarship Program, specifically, for one or more of the following activities (a) scholarship contributions to eligible recipients; (b) building the endowment; (c) direct program administration costs; or (d) soliciting private donations to the Opportunity Scholarship Program. In addition, investment earning will be pledged to the same purposes.
 - iii. All assets held in the Scholarship Account and in the Endowment Account are held in trust by CSF for the exclusive benefit of the WSOS Board to carry out the purposes set forth in Ch. 28B.145 RCW.
 - iv. Should the appointment of CSF as WSOS Administrator be terminated, or should CSF resign as WSOS Administrator, or should CSF cease operations for any reason while it is still under contract as the WSOS Administrator, CSF will promptly transfer all assets held in the Scholarship Account and in the Endowment Account to a successor WSOS Administrator or to the WSOS BOARD, as directed by the WSOS BOARD.
 - b. Award funds from the scholarship account on an annual basis.
 - c. Consult with WSAC and the Office of Financial Management prior to disbursing funds from the endowment account.
 - i. Endowment account scholarship disbursements occur only if the state match

has been made into both accounts; the appropriations for State Need Grant meet or exceed appropriations made in the 2011-2013 biennium, adjusted for inflation, and eligibility for State Need Grant is at least 70 percent of median family income; and the state has made progress in per-student funding levels as provided in RCW 28B.145.030.

- d. Ensure transparency in the investment decisions and process.
3. Support the WSOS BOARD and staff in developing annual fund raising goals and soliciting funds.
 - a. Help solicit and accept grants and contributions from private sources, via direct payment, pledge agreement, or otherwise for deposit into one or both of the two accounts.
 - b. Provide proof of receipt of grants and contributions from private sources to WSAC, identifying the amounts received by name of private source and date, and whether the amounts received were deposited into the scholarship or the endowment account as determined by the legislation.
 - c. Deposit at least fifty percent of all grants and contributions into the scholarship account until twenty million dollars have been deposited.
 - i. After twenty million dollars in total from all sources have been deposited into the scholarship account, private donors may designate whether their contributions must be deposited to the scholarship or the endowment account.
 - d. Verify that state matching fund expenditures do not exceed the total amount of private contributions.
4. Design and manage the scholarship program.
 - a. Develop and implement a promotion, application, selection, and notification process for awarding opportunity scholarships.
 - b. Make awards no later than October 1 each year.
 - c. Provide verification that scholarship awards disbursed from the endowment account from earnings occur only in years that meet the criteria described in RCW 28B.145.030.
 - d. Determine the scholarship award amounts.
 - i. The award shall be at least one thousand dollars or the difference in tuition and fees from 2008-09 to the academic year of disbursements.
 - ii. Awards may be increased on an income-based sliding scale to cover eligible expenses or encourage participation in targeted programs.
 - iii. Scholarships should be renewable to the extent funds are available.
 - e. Disburse scholarships to eligible Washington resident students at or below 125 percent median family income enrolled in eligible programs up to 125 percent of the length of the program, and other criteria as specified in RCW 28B.145.
 - i. Students must file a Free Application for Federal Student Aid and apply for educational tax credits if applicable.
 - f. Notify institutions of scholarship recipients and terms of the student's eligibility.

- g. Consult with WSAC and the State Board for Community and Technical Colleges to determine eligible educational expenses.
5. Manage the Opportunity Expansion Program (OEP)
 - a. Assist WSOS BOARD with development and implementation of an application, selection, and notification process for making OEP awards to institutions of higher education.
 - b. Accept grants and contributions from private sources for OEP awards.
 6. CSF shall maintain the following insurance at the following limits to satisfy its obligations under this Agreement:

Directors & Officers Liability Full Prior Acts Coverage	\$5,000,000
Employment Practices Liability Full Prior Acts Coverage	\$5,000,000
Fiduciary Liability	\$1,000,000
Employee Dishonesty with ERISA Fidelity	\$500,000 \$500,000
Forgery Alteration	\$50,000

7. Additional responsibilities as detailed in a separate Compensation Agreement between the WSOS Board and CSF and which is incorporated by reference into this Contract.

WSAC

WSAC will manage the Opportunity Scholarship Match Transfer Account. Primary responsibilities include:

1. Subject to the availability of funds appropriated to provide matching funds for the Opportunity Scholarship program, ensure funds are transferred to the Opportunity Scholarship Match Transfer Account.
2. Ensure that transfers of state matching funds to the scholarship account and the endowment account do not exceed the total amount of private contributions deposited in each account.
3. Authorize transfers in a timely manner following receipt of proof of private contributions. The transfer of matching funds to the Program Administrator under the terms of this agreement, as provided under RCW 28B.145.050(5), furthers the fundamental governmental purpose of providing educational opportunity to students attending institutions of higher education in Washington, through the means of this public-private partnership created to provide scholarships to help mitigate the impact of tuition increases and increase the number of baccalaureate degrees in high employer demand and other programs. This agreement acknowledges that valuable consideration has been given through the receipt of private contributions to the Opportunity Scholarship program in furtherance of these public purposes and the transfer of matching funds is authorized in exchange for such consideration.

4. Ensure that total expenditures from the Opportunity Scholarship Match Transfer Account do not exceed the total amount of private contributions.
5. Contract with the Program Administrator on behalf of the WSOS BOARD.

PERIOD OF PERFORMANCE

The period of performance under this contract will be from July 1, 2015, or date of execution, whichever is later, through June 30, 2016. The initial period of performance may be extended in two-year increments by amendment properly executed and signed by an authorized person on behalf of each party to this agreement, not to exceed a total of ten (10) years.

COMPENSATION

Total compensation payable to CSF for satisfactory performance of the work under this contract shall be determined by WSOS BOARD on the basis of good faith negotiations between WSOS BOARD and CSF under a separate contract for the performance of all things necessary for or incidental to the performance of work as set forth in the Scope of Work.

CONTRACT MANAGEMENT

The Contract Manager for each of the parties shall be the contact person for all communications and billings regarding the performance of this contract.

CSF Contract Manager	WSAC Contract Manager
Paul Kruglik, Chief Financial Officer College Success Foundation 1605 NW Sammamish Rd, Suite 100 Issaquah, WA 98027 <i>Phone:</i> 425-416-2000 <i>Fax:</i> 425-416-2001 <i>Email address:</i> pkruglik@collegesuccessfoundation.org	Rachelle Sharpe, Senior Director of Student Financial Assistance & Support Services (Interim Deputy Director) Washington Student Achievement Council 917 Lakeridge Way SW P.O. Box 43430 Olympia, WA 98504-3430 <i>Phone:</i> 360-753-7872 <i>Fax:</i> 360-753-7808 <i>Email address:</i> rachelles@wsac.wa.gov

ASSURANCES

The parties to this contract agree that all activity pursuant to this contract will be in accordance with all applicable current federal, state, and local laws, rules, and regulations.

ACCESS TO DATA

In compliance with RCW 39.29.080, CSF shall provide access to data generated under this contract to WSAC, the Joint Legislative Audit and Review Committee, and the State Auditor at no additional cost. This includes access to all information that supports the findings,

conclusions, and recommendations of CSF reports, including computer models and methodology for those models.

AMENDMENTS

This contract may be amended by mutual agreement of the parties. Such amendments shall not be binding unless they are in writing and signed by personnel authorized to bind each of the parties.

AMERICANS WITH DISABILITIES ACT (ADA) OF 1990, PUBLIC LAW 101-336, also referred to as the "ADA" 28 CFR Part 35

CSF must comply with the ADA, which provides comprehensive civil rights protection to individuals with disabilities in the areas of employment, public accommodations, state and local government services, and telecommunications.

CONFORMANCE

If any provision of this contract violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

ASSIGNMENT

Neither this contract, nor any claim arising under this contract, shall be transferred or assigned by CSF without prior written consent of the WSOS BOARD and WSAC.

ATTORNEYS' FEES

In the event of litigation or other action brought to enforce contract terms, each party agrees to bear its own attorney fees and costs.

ENTIRE CONTRACT

This contract, including referenced exhibits, represents all the terms and conditions agreed upon by the parties. No other statements or representations, written or oral, shall be deemed a part hereof.

GOVERNING LAW

This contract shall be construed and interpreted in accordance with the laws of the State of Washington and the venue of any action brought hereunder shall be in the Superior Court for Thurston County. If any provision of this contract violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

INDEMNIFICATION

Each party shall be responsible for the negligence of its own employees or agents in the performance of this Contract.

To the fullest extent permitted by law, WSOS BOARD and CSF expressly agree to indemnify, defend, and hold harmless WSAC for any claim arising out of or incident to CSF performance or failure to perform the contract. This indemnification includes any claim by or

against CSF or WSOS BOARD, or their agents, employees, representatives, or any subcontractor or their employees.

INDEPENDENT CAPACITY OF CSF

The parties intend that an independent relationship will be created by this contract. CSF and its employees or agents performing under this contract are not employees or agents of WSAC or WSOS BOARD. CSF will not hold itself out as or claim to be an officer or employee of WSAC, WSOS BOARD, or the State of Washington by reason hereof, nor will CSF make any claim of right, privilege, or benefit that would accrue to such employee under law. Conduct and control of the work will be solely with CSF.

INDUSTRIAL INSURANCE COVERAGE

CSF shall comply with the provisions of Title 51 RCW, Industrial Insurance. If CSF fails to provide industrial insurance coverage or fails to pay premiums or penalties on behalf of its employees, as may be required by law, WSAC may collect from CSF the full amount payable to the Industrial Insurance accident fund. WSAC may deduct the amount owed by CSF to the accident fund from the amount payable to CSF by WSAC under this contract, and transmit the deducted amount to the Department of Labor and Industries (L&I) Division of Insurance Services. This provision does not waive any of L&I's rights to collect from CSF.

NONDISCRIMINATION

During the performance of this contract, CSF shall comply with all federal and state nondiscrimination laws, regulations, and policies.

ORDER OF PRECEDENCE

Each of the exhibits listed below is by this reference hereby incorporated into this contract. In the event of an inconsistency in this contract, the inconsistency shall be resolved by giving precedence in the following order:

1. Applicable federal and state of Washington statutes and regulations.
2. Terms and conditions contained in this contract.
3. Any other provision, term or material incorporated herein by reference or otherwise incorporated.

PUBLICITY

CSF agrees to submit all advertising and publicity matters relating to the Opportunity Scholarship and Expansion programs for approval in concept by WSOS BOARD prior to publication.

RECORDS MAINTENANCE

CSF shall maintain books, records, documents, data, and other evidence relating to this contract and performance of the services described herein, including but not limited to accounting procedures and practices that sufficiently and properly reflect all direct and indirect costs of any nature expended in the performance of this contract.

CSF shall retain such records for a period of six (6) years following the date of final payment. At no additional cost, these records, including materials generated under the contract, shall be subject at all reasonable times to inspection, review, or audit by WSAC, WSOS BOARD, the Office of the State Auditor, and federal and state officials so authorized by law, regulation, or agreement.

If any litigation, claim, or audit is started before the expiration of the six-year period, the records shall be retained until all litigation, claims, or audit findings involving the records have been resolved.

REGISTRATION WITH DEPARTMENT OF REVENUE

CSF shall complete registration with the Washington State Department of Revenue and be responsible for payment of all taxes due on payments made under this contract.

RIGHT OF INSPECTION

CSF shall provide right of access to its facilities at all reasonable times, to WSAC, WSOS BOARD, or to any other agent or official of the state of Washington or the federal government, authorized for these purposes, to monitor and evaluate performance, compliance, and/or quality assurance under this contract.

SEVERABILITY

The provisions of this contract are intended to be severable. If any term or provision is illegal or invalid for any reason whatsoever, such illegality or invalidity shall not affect the validity of the remainder of the contract.

TAXES

All payments accrued because of payroll taxes, unemployment contributions, any other taxes, insurance, or other expenses for CSF or its staff shall be the sole responsibility of CSF.

WAIVER

Waiver of any default or breach shall not be deemed a waiver of any subsequent default or breach. Any waiver shall not be construed to be a modification of the terms of this contract unless stated to be such in writing and signed by authorized representative of WSAC and WSOS BOARD.

APPROVAL

This contract shall be subject to the written approval of the WSAC executive director and shall not be binding until so approved. The contract may be altered, amended, or waived only by a written amendment executed by all parties.

THIS CONTRACT, consisting of 10 pages, is executed by the persons signing below, who warrant they have the authority to execute the contract.

IN WITNESS WHEREOF, the Washington Student Achievement Council Executive Director; the Washington Opportunity Scholarship Board Chair; and the College Success Foundation Chief Executive Officer have executed this Contract on the dates indicated:

WA State Opportunity Scholarship Board

Washington Student Achievement Council

Signature

Title Date

Signature

Title Date

College Success Foundation

Signature

Date

APPROVED AS TO FORM:

Assistant Attorney General

Date

**COMPENSATION AGREEMENT
THE
WASHINGTON STATE OPPORTUNITY SCHOLARSHIP BOARD
AND
COLLEGE SUCCESS FOUNDATION**

The Washington State Opportunity Scholarship Board, hereinafter referred to as the WSOS Board; and the College Success Foundation, hereinafter referred as CSF, agree, along with the Washington Student Achievement Council (WSAC), to the terms and conditions contained in Contract No. _____ for administration of the Washington State Opportunity Scholarship and Expansion programs as outlined in RCW 28B.145. Additionally, the WSOS Board and CSF now agree to the terms and conditions outlined in this Agreement which supplements the Contract between HECB, OSB and CSF dated February 14, 2012.

PURPOSE

The WSOS Board provides oversight and guidance for the Washington State Opportunity Scholarship program as outlined in the statute and the contract between the Washington Student Achievement Council (WSAC), the WSOS Board, and CSF and dated _____, which sets forth primary responsibilities of the WSOS Board.

CSF, serving as the WSOS Program Administrator, shall provide administrative support to WSOS staff members, support the WSOS Board and provide the duties and responsibilities as outlined in the statute and as set forth in the above referenced contract between the WSAC, WSOS Board and CSF to manage the scholarship fund accounts and administer the scholarship program.

The purpose of this Compensation Agreement is to set forth total compensation the WSOS Board has agreed to pay CSF as WSOS Program Administrator for satisfactory performance of the work under the aforementioned contract for services rendered by CSF.

WSOS Program Administrator Fee

Total compensation payable to CSF shall be based on satisfactory performance of the work under this Agreement, and the contract dated _____ and as set forth in the attached Exhibit A, Scope of Work and Key Deliverables, and Exhibit B, 2015/16 Budget. In addition, CSF shall be reimbursed for other expenses approved by the WSOS Board that are not included in Exhibit A, Scope of Work.

1. The program administration fees outlined in Exhibit A, Scope of Work and other approved expenditures of CSF shall be paid to CSF on a monthly basis
2. The above payments to CSF shall be made within 15 days of receipt of invoice from CSF.

3. The cost of scholarships disbursed, the WSOS program administration fees and other expenses shall be paid from the Washington State Opportunity Scholarship Account and the Opportunity Endowment Account income or Principal as appropriate under general accepted accounting principles and Washington State law.

WSOS Program Administrator Budget

Attached as Exhibit B is the 2015/2016 WSOS Program Budget approved by the WSOS Board. The WSOS Board will approve the budget for WSOS Program Administrator for the next year of performance by June 30 and inform the WSOS Program Administrator of such approval.

WSOS Program Administrator Financial Status

The WSOS Program Administrator will provide the WSOS Board with CSF consolidated and CSF segment specific reporting every six months.

PERIOD OF PERFORMANCE

The period of performance of this Agreement shall be from July 1, 2015 through June 30, 2016. This Agreement shall be renewed for a successive one-year period, provided Contract No. _____ between the parties and the WSAC, or a successor service agreement remains in place.

ORDER OF PRECEDENCE

Each of the exhibits listed below is by this reference hereby incorporated into this contract. In the event of an inconsistency in this contract, the inconsistency shall be resolved by giving precedence in the following order:

1. Exhibit A – CSF Scope of Work and Key Deliverables
2. Exhibit B – 2015/2016 WSOS Program Budget

APPROVAL

This Agreement becomes binding and enforceable after signature by both parties. Signators represent and warrant that they have authority to execute this Agreement on behalf of each respective party. The contract may be altered, amended, or waived only by a written amendment executed by both parties.

ENTIRE AGREEMENT

This contract, including referenced exhibits, represents all the terms and conditions agreed upon by the parties. No other statements or representations, written or oral, shall be deemed a part hereof.

CONFORMANCE

If any provision of this contract violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

IN WITNESS WHEREOF, the Washington State Opportunity Scholarship Board members and the College Success Foundation Chief Executive Officer have executed this Agreement on the dates indicated on the page following:

College Success Foundation

By: _____
Signature

Yolanda Watson Spiva, Chief Executive Officer
Name and Title *(please print)*

Date

Washington State Opportunity Scholarship Board

By: _____
Signature

Bradford L. Smith, Chair
Name and Title *(please print)*

Date

Who certifies that this person is duly qualified and authorized to bind the Contractor so identified to the foregoing Agreement.

Approved as to Form:

Name and Title

Date

FY16 COLLEGE SUCCESS FOUNDATION | SCOPE OF WORK AND KEY DELIVERABLES

The Washington State Opportunity Scholarship (WSOS) supports low- and middle income students pursuing eligible, high-demand majors in science, technology, engineering and mathematics (STEM) and health care, and encourages recipients to work in Washington State once they complete their degrees. To date, more than 5,400 scholarships have been awarded to students pursuing STEM and health care degrees at 68 colleges. By the fall of 2015, more than 1500 scholars will have graduated, and nearly 90 percent of graduating scholars will have found work in Washington State. This is the first program of its kind in the nation to mitigate the skills gap through the combined strategy of college scholarships and wrap-around support services for scholarship recipients.

WSOS is a public private partnership created and defined by legislation and governed by an eleven-member Board of Directors, all appointed by the Governor of the State of Washington. Per the legislation, the WSOS Board of Directors sets the overall strategic direction of the program and is jointly administered through an Interagency Agreement between the WSOS Board of Directors, the Washington Student Achievement Council, and a contracted Program Administrator.

The College Success Foundation (CSF) currently serves as the Program Administrator.

Through CSF's administrative and programmatic support, WSOS will achieve the following strategic goals:

- A. Promote the scholarship to a wide range of potential scholars.
- B. Design and deliver STEM support services to WSOS scholars that meet the diverse needs of our scholar population;
- C. Raise private support and investments from industry leaders, cornerstone families, and major donors, and secure state match for all private investments; and
- D. Increase public awareness of WSOS, its scholars, and its impact.

To support the above goals, which are further detailed in the 2015-16 WSOS Work Plan (See Exhibit A), the CSF will deliver the following key deliverables, as directed by WSOS Board and staff:

A. PROVIDE SUPPORT TO WSOS STAFF MEMBERS

In FY16, CSF will provide eight (8) WSOS staff members with administrative and operational support as detailed in Section E and F. In addition, WSOS Staff will occupy office space at the CSF National Office in Issaquah, WA (see Section F).

WSOS Staff members include the following individuals:

2015-16 WSOS Staff Members		
Position	Description	FTE
Executive Director	The WSOS Executive Director reports to the Chair of the WSOS Board of Directors. The Program Administrator serves as the employer of record for the WSOS Executive Director and staff. In collaboration with the Program Administrator, the WSOS Executive Director is responsible for (1) leading and managing the WSOS resource development, fundraising activities and marketing, (2) supervising and managing WSOS staff members who are employees of the Program Administrator, (3) monitoring all activities necessary to implement the WSOS Board's strategic vision for the program. This position is currently filled by Naria K. Santa Lucia.	1.0
Director of STEM Support Services	Reporting to the WSOS Executive Director, the Director of STEM Support Services – Western Washington is responsible for promoting the WSOS program, overseeing programming to support WSOS Scholars' access to STEM or healthcare degree, and helping WSOS Scholars launch a career in STEM/healthcare. The position is currently held by Theresa Britcshgi.	1.0
Director of STEM Support Services – Eastern Washington	Reporting to the WSOS Executive Director, the Director of STEM Support Services – Eastern Washington is responsible for promoting the WSOS program, overseeing programming to support WSOS Scholars access STEM or healthcare degree, and helping WSOS Scholars launch a career in STEM/healthcare. Terrie Ashby-Scott will transition into this position in FY16 (she is currently a WSOS Senior Program Officer).	1.0
Program Officer – STEM Support Services	Reporting to the Director of STEM Support Services, the STEM Support Services assists with WSOS program promotion and pipeline development activities, promotes WSOS program activities to scholars, and assists in the planning and execution of WSOS program events. This position is currently unfilled.	1.0
Administrative Asst.	Reporting to the WSOS Executive Director, the WSOS Administrative Assistant provides administrative support to the WSOS Executive Director and other WSOS team members, as requested. Chief functions include scheduling and coordinating meetings, expense reporting and processing, constituent database management, and assistance with development coordination. This currently position is currently filled by Karyl Gregory.	0.75
Community Affairs Manager	Reporting to the WSOS Executive Director, the Community Affairs Manager leads WSOS strategy around external messaging, marketing, and branding. The Community Affairs manager also leads the recruitment of partnerships for Industry Exploration events. Megan Nelson will transition into this role in FY16 (she is currently the WSOS Marketing and Communications Manager).	1.0
Communications Associate	Reporting to the Community Affairs Manager, the Communications Associate develops messages for the WSOS website, social media and other outlets for a variety of audiences including WSOS Scholars, partners, constituents, industries, associations, etc. This position is currently unfilled.	1.0
Director of Corporate Relations & Special Events	Reporting to the WSOS Executive Director, the Director of Corporate Relations and Special Events is responsible for cultivating and stewarding corporate donors and sponsors. In addition to managing these key relationships, the Director of Corporate Relations and Special Events plans and leads WSOS large-scale fundraising events and donor salons. This position is currently filled by Erin Ashley.	1.0

B. SCHOLARSHIP PROMOTION AND SELECTION

The CSF Scholarship Services department will (1) work in partnership with WSOS STEM Support program staff to promote the WSOS scholarship with various audiences including but not limited to high schools, colleges and universities, community partners, school districts, etc., (2) manage all aspects of the scholarship process including application, selection, awarding, notification and renewal processes, and (3) monitor scholar compliance with scholarship eligibility & retention criteria.

2015-16 Key Deliverables by CSF Scholarship Services Department (See WSOS 2015-16 Work Plan Sec III.A.1&2):

1. Annually design an accessible online scholarship application.
2. Disseminate WSOS application materials to all high schools, eligible colleges and universities, community partners and school districts.
3. Provide application training to internal CSF staff and five (5) application trainings to select outside partner organizations.
4. Answer student, parent, and community questions about the scholarship application process and eligibility.
5. Collect all scholarship application paperwork and assess and evaluate student scholarship applicant eligibility.
6. Execute scholarship selections.
7. Notify all applicants of selection results.
8. Modify and update the scholarship renewal process.
9. Assess and evaluate applicant renewal eligibility.
10. Notify all renewal applicants of results.
11. Manage Scholarship paperwork required for applicable scholarship increases.
12. Provide timely answers to inquiries from colleges/universities and applicants throughout the calendar year).
13. Produce data and reports to the WSOS staff members and Board of Directors, as requested.

C. RESEARCH AND EVALUATION

Members of the CSF Research, Evaluation, Planning and Accountability (REPA) department will measure WSOS programs for impact, collect and analyze data necessary to report WSOS outcomes to a wide range of audiences and conduct ongoing research on STEM and healthcare pipeline, higher education and career placement trends.

2015-16 Key Deliverables by CSF Research and Evaluation Department (See WSOS 2015-16 Work Plan Sec. IV):

1. Produce annual Legislative Report and manage all aspects of data collection and analysis related to publication of report.
2. Produce annual graduation and self-reported employment data and manage all aspects of data collection and analysis related to publication of report(s).

3. Develop surveys and tools to analyze Scholar support program effectiveness, impact and fidelity.
4. Research and develop other reports as requested by WSOS staff.

D. DEVELOPMENT AND ADVOCACY

As directed by the WSOS Board and staff, CSF's advancement team will provide critical government relations and advocacy assistance to WSOS as well as key development coordination activities, including gift processing and reconciliation, data entry and integrity, and donor acknowledgments.

2015-16 Key Deliverables by CSF Advancement Department (See WSOS 15-16 Work Plan Sec. V & VI):

1. Government Relations
 - A. As directed by the WSOS Board and staff, support lobbying efforts for WSOS appropriations and program enhancements, help educate policymakers on the need for, and successes of, the program, and manage contracts with outside lobbyists.
 - B. In coordination with WSOS staff, support key relationships with legislators, policymakers and staff on behalf of WSOS.
 - C. Keep apprised of trends in the state legislature and assist WSOS staff with developing strategies to respond to key trends, if necessary.
2. Development Coordination
 - A. Maintain and upload donor records into Raiser's Edge donor database.
 - B. Process gifts and produce donor acknowledgement letter(s) within 48 business hours of gift receipt.
 - C. Reconcile gifts and pledges.
 - D. Provide training and timely assistance to WSOS team members on Raiser's Edge.
 - E. Run queries and reports in Raiser's Edge, as requested.

E. OPERATIONS/ADMINISTRATION OVERHEAD (FINANCE, ADMIN, HR AND INFORMATION TECHNOLOGY)

CSF will provide administrative, operational and organizational support to WSOS staff. The operations/administrative fee is calculated at 15% of program expenses (including direct expenses to CSF for programmatic support outlined in Sections B, C and D, expenses related to WSOS Staff, professional services and consulting fees and program expenses) (See Appendix B – FY16 WSOS Program Budget for more details).

2015-16 Key Deliverables by CSF:

1. Accounting and Finance
 - A. Responsibility for the full accounting cycle for WSOS through financial statements.
 - B. Provide financial analysis in the areas of WSOS Scholarships operating performance, financial strength and solvency, cash flow and scenario planning.
 - C. Treasury management including investment management, receiving pledges and donations, paying bills on behalf of WSOS, and providing WSOS staff with company credit cards.

- D. Support the WSOS Finance and Investment Committee by preparing financial statements, materials and miscellaneous other requests as directed by the Committee.
 - E. Prepare and file all federal, state and local tax, compliance and regulatory forms and resolve liabilities where applicable.
 - F. Responsibility for the full payroll cycle.
2. Human Resources
- A. Full cycle hiring process including recruiting, interview coordination, drug/background testing and onboarding.
 - B. Benefits administration, planning and implementation including retirement, medical/dental/vision, flexible spending account, life/ long disability/Ad&D insurance.
 - C. Payroll processing including benefit deduction, vacation/sick balances and tax filing.
 - D. Human resources programs that support employee evaluation, development and retention.
3. Information Technology
- A. Network, internet connectivity, telephone, and printing/faxing support including e-mail hosting/Outlook web access/PDA phone support, website hosting with core content update support, workgroup printer, multi-function copier, fax machine and video and telephone conferencing support.
 - B. Provide helpdesk support including multi-media, event/meeting support, desktop training, account maintenance, hardware support, and software support.
 - C. Management of various databases/software packages, donor/prospect/pledge-tracking, accounting databases, and event mailing/rsvp databases.
 - D. Other IT support including asset tracking, user training, maintenance, file backup and recovery systems, public domain name service configuration maintenance, and creation of IT Policies & Procedures.

F. OCCUPANCY/FACILITIES

2015-16 Key Deliverables by CSF:

- 1. Two executive-sized offices, one with and two workstations (including furniture and ergonomics) at national office including common area charges and maintenance, telephone sets, direct phone numbers, long distance service, Multi-party conference call service.
- 2. Meeting facilities including multi-media equipment, storage, kitchen with coffee/beverage for staff and guests, quarterly carpet cleaning, security system and monitoring, database coding for copy machine and postage meter.
- 3. Property Insurance, coordination of repairs, maintenance and cleaning, facilities policies and procedures.

FY16 ANTICIPATED CSF TEAM & PROJECTED COSTS

Scholarship Services	Approx FTE /Anticipated Hours	Projected Cost
Vickie Rekow, Director of Scholarship Services	3.0 FTE or 120 hrs/wk	\$208,000
Kim King, Program Officer		
Jilian Ryan, Program Officer		
Lauren Hardin, Program Officer		

Development and Advocacy	Approx FTE /Anticipated Hours	Projected Cost
Juliette Schindler Kelly, Director of Government Relations	0.25 FTE or 10 hrs/wk	\$62,000
Jenna Magnotti, Development Coordinator	0.25FTE or 10 hrs/wk	
Erin Bricker, Database Coordinator		
Michael Cheever, Chief Advancement Officer		

Research and Evaluation	Approx FTE /Anticipated Hours	Projected Cost
Jeff Knudsen, Director of REPA	1.0 FTE or 40 hrs/wk	\$93,000
Kelly Bay-Meyer, Senior Evaluation Officer		
Kimber Connors, Research & Evaluation Officer		

Operations & Administration	Approx FTE /Anticipated Hours	Projected Cost
Paul Kruglik, CFO	0.75 FTE or 30 hrs/wk	\$234,687
Debbie Weiss Wilson, Senior Financial Analyst		
Deb Daugherty, Quality Improvement Manager		
Susan Gibson, Accountant		
Francis Ching, HR Generalist	0.15 FTE or 6 hrs/wk	
Pat Hardwick, Director of IT	0.75FTE or 30 hrs/wk	
Gena Peth, Data Systems Manager		
Jen Tell, Data Analyst		
Kate Carson, Database Assistant		
Benjamin Lutz, Front End Developer		
Help Desk		
Tara Rockey, Office Manager		
Lilia Fomai, Receptionist		
Other General Office Staff		

EXHIBIT A. 2015-16 WSOS ANNUAL WORK PLAN

FY2016 ANNUAL WORK PLAN

I. OVERVIEW OF WSOS

The Washington State Opportunity Scholarship (WSOS) supports low- and middle income students pursuing eligible, high-demand majors in science, technology, engineering and mathematics (STEM) and health care, and encourages recipients to work in Washington State once they complete their degrees. To date, more than 5,400 scholarships have been awarded to students pursuing STEM and health care degrees at 68 colleges. By the fall of 2015, more than 1500 scholars will have graduated, and nearly 90 percent of graduating scholars will have found work in Washington State. This is the first program of its kind in the nation to mitigate the skills gap through the combined strategy of college scholarships and wrap-around support services for scholarship recipients.

WSOS is a public private partnership created and defined by legislation and governed by an eleven-member Board of Directors, all appointed by the Governor of the State of Washington. Per the legislation, the WSOS Board of Directors sets the overall strategic direction of the program and is jointly administered through an Interagency Agreement between the WSOS Board of Directors, the Washington Student Achievement Council, and a contracted Program Administrator.

The College Success Foundation (CSF) currently serves as the Program Administrator.

II. STRATEGIC GOALS FOR 2015-16

- A. Promote the Scholarship to a wide range of potential Scholars.
- B. Design and deliver STEM Support Services to WSOS Scholars that meet the diverse needs of our Scholar population;
- C. Raise private support and investments from industry leaders, cornerstone families, and major donors, and secure state match for all private investments; and
- D. Increase public awareness of WSOS, its Scholars, and its impact.

A. WSOS OUTCOMES, STRATEGIES AND TACTICS

- A. Program: Scholarship Promotion, Scholarship Selection and Awarding, Scholar Persistence, Scholar Future-Readiness

To meet the goal of increasing the talent pipeline of students prepared to enter high-demand fields in Washington State, the WSOS team and contractors will execute a variety of direct service and brokered opportunities. Additionally, WSOS will take advantage of strong partnerships with existing STEM networks to increase awareness of, and demand for, STEM-related degrees among Washington's preK-12 student population. Chief partners in this collaborative effort include the College Success Foundation, Washington STEM, Washington MESA, the Washington ACTE and the Office of the Superintendent of Public Instruction -

as well as service providers such as TEALS, First Robotics, and Project Lead the Way which collectively engage with thousands of qualified and diverse high school students and educators across the state annually.

1. Scholarship Promotion – Efforts to promote the WSOS scholarship will be led by the WSOS Program Director in collaboration with WSOS staff members, the CSF Scholarship Services Department, and community/university partners.
 - a. Outcome
 - At least 5000-5500 students create and begin the WSOS application process
 - At least 2000-2200 students submit a WSOS application
 - b. Strategies
 - Participate in campaigns designed to raise statewide STEM awareness.
 - Increase visibility of scholarship during application period and throughout the year.
 - Provide training and resources to disseminate to partners and networks.
 - c. Tactics
 - Sponsor and/or participate in >12 student and educator signature STEM events offered statewide (e.g., Imagine Tomorrow, MESA Day, TEALS Field Day, UW Diversity Fair, Spokane STEMposium).
 - Attract and train WSOS volunteer and contracted advocates to promote the Scholarship within target audiences.
 - Craft and disseminate audience-specific WSOS print and e-resources through media and stakeholder channels.
 - Annually design an accessible online scholarship application.
 - Disseminate WSOS application materials to all high schools and eligible colleges and universities.
 - Conduct a print and social media campaign to raise statewide awareness for college/STEM fields and the WSOS Scholarship application.
 - Provide training on the WSOS application process to internal CSF staff and five application trainings to select outside partner organizations.
 - Provide direct application training to Scholars, educators, counselors, advocates and higher education partners (e.g., financial aid departments and department advisors).
2. Scholarship Selection and Awarding – WSOS Scholarship Selection and Awarding will be led by the CSF Scholarship Services team in close collaboration with WSOS staff members.

Scholarships selection, awarding, renewal and annual increase process will be managed in partnership and collaboration with college and university financial aid offices.

- a. Outcomes
 - At least 1450 new Scholarships are awarded for 2016-17 (Cohort 5).

b. Strategies

- Create clear, concise scholarship application and renewal processes and tools.
- Streamline scholarship awarding, renewal, and reviewing processes.
- Provide effective and timely communications to all relevant constituents including students, parents, colleges and universities financial aid offices, high schools, etc.

c. Tactics

- Modify and update the scholarship renewal process.
- Collect all scholarship application paperwork and assess and evaluate student scholarship eligibility.
- Track student eligibility and answer student, parent and community questions regarding eligibility.
- Manage Scholarship paperwork required for the Scholarship increase.
- Provide timely answers to inquiries from colleges/universities and applicants throughout the calendar year.

3. Scholar Persistence

The Scholar persistence element of the WSOS work plan draws on research which suggests that real world relevance positively influences persistence in undergraduate STEM fields. Led by the WSOS program staff, persistence efforts will center on college and career supports which connect WSOS Scholars with a range of real-world experiences and opportunities focused on their specific fields of study. This will be accomplished through collaboration with higher education faculty, research staff and leadership as well as industry partners. Further, this programmatic element has ties to community-building and fundraising goals.

a. Outcomes

- At least 65 percent of WSOS Scholars persist in post-secondary STEM and healthcare-related courses and majors at Washington state 2- and 4-year colleges and universities annually.
- WSOS Scholars:
 - can report knowledge of WSOS renewal process
 - are aware of support services offered by their colleges and through WSOS
 - have renewed their Scholarships, if eligible
 - have connected with at least one STEM professional
 - report a sense of community among current and alumni WSOS Scholars
 - possess growing professional and academics skills that make them future ready
 - persist in an approved, high-demand STEM or health care major
 - complete BS/BA in high-demand STEM or health care majors
 - retain a job in WA or attend graduate school

b. Strategies

- Provide college and career resources to WSOS Scholars.
- Provide professional development skills training for WSOS Scholars.
- Provide opportunities for WSOS Scholars to access networks and STEM professionals.
- Reach out to WSOS Scholars who are struggling in their major.
- Raise employers' awareness of this rising talent pool.

c. Tactics

- Develop an accessible online renewal form.
- Develop and deliver robust resource identification and orientation materials (including campus welcome events) at program entry point and renewal point
- Conduct "office hours" at leading campus locations to connect with and counsel > 10% of WSOS Scholars, especially those who are struggling in one of the critical areas of academics, financial aid, career exploration and personal well-being.
- Provide professional and soft-skills development through direct service or brokered opportunities (e.g., connected to campus career fairs via employer partners or webinars).
- Participate in ≥ 12 campus career fairs annually to encourage Scholar participation and raise WSOS awareness with employers.
- Develop, engage and maintain a network of STEM professionals to provide mentoring, consultation, and access for WSOS Scholars.
- Position WSOS Scholars for opportunities to participate in external network opportunities (research symposium, internships, panel participation, company tours, and speaking opportunities). Inventory available external network opportunities and share through various communication modalities.
- Promote valuable campus and regional opportunities through WSOS communications modalities (e.g., career fairs, research symposia, travel abroad and scholarship opportunities).
- Conduct an annual Scholars' needs assessment (pertaining to the critical areas noted above) linked to the annual scholarship renewal.

4. Scholar Future-Readiness

Data collected through WSOS graduate surveys as well as published reports have been invaluable in identifying the trends and dynamics associated with WSOS Scholars' progressions and ultimately informing the WSOS future-readiness elements described below. This pillar of the program is highly associated with WSOS promotional and development strategies in as much that increased awareness of this rising talent pool will result in more placements as well as needed program revenue.

a. Outcomes

- 1) WSOS Scholars:

- are aware of support services offered by their colleges and through WSOS
 - have connected with at least one STEM professional
 - have participated in a career fair, research or experiential learning opportunity
 - report a sense of community among current and alumni WSOS Scholars
 - possess professional skills that make them future-ready
 - persist in an approved, high-demand STEM or health care major
 - complete BA in an approved, high-demand STEM or health care major, and
 - obtain a job or grad school in WA.
- 2) At least 65 percent of WSOS graduates seeking employment report obtaining employment in a high-demand field within one year of graduation.
- b. Strategies
- Provide college and career resources to WSOS Scholars.
 - Provide professional development skills training for WSOS Scholars.
 - Provide opportunities for WSOS Scholars to access networks and STEM professionals.
 - Raise employers' awareness of this rising talent pool.
 - Track Scholar placement trends in each industry sector.
- c. Tactics
- Conduct Office Hours (see Persistence section)
 - Provide professional and soft-skills development (see Persistence section)
 - Participate in > 12 campus career fairs annually to encourage Scholar participation and raise WSOS awareness with employers.
 - Develop, engage and maintain a network of STEM professionals (see Persistence section).
 - Position WSOS Scholars for opportunities to participate in external network opportunities – and archive/share these opportunities with Scholars (see Persistence section.)
 - Raise the visibility of the program and Scholars to state high-demand industry sectors through networking, internship and recommendation efforts (additional Administrative outcomes).
 - Conduct annual survey of WSOS alumni 6 months after graduation to assess cohort placement in high-demand fields in Washington State.

IV. RESEARCH AND EVALUATION

As a data-driven program, WSOS values the collection, analysis and application of data to continually improve WSOS program effectiveness and Scholar outcomes. Data will be collected, maintained and analyzed by CSF

a. Outcomes

- WSOS participants' (applicants, awardees, and graduates) demographics are collected and analyzed.
 - WSOS scholars' short-term outcomes (e.g., changes in attitudes beliefs and knowledge resulting from WSOS event participation); intermediate outcomes (e.g., changes in behavior, such as career preparation activity completion and college retention) and long-term outcomes (i.e., college graduation and employment) are measured, analyzed and reported.
 - Comparison data is used when available to benchmark scholar outcomes.
 - Program attribution is measured through a combination of program efficacy measures (e.g., event satisfaction and utility) and dosage data measures (i.e., frequency and duration of program supports received) to determine the extent to which Scholar outcomes are a result of WSOS programming.
- b. Strategies
- Experienced CSF program evaluators facilitate the development and maintenance of the WSOS program logic model and lead the program's evaluation design, data collection, analysis and reporting.
 - The evaluation team conducts research and stays apprised of trends in STEM higher education.
- c. Tactics
- Key demographics collected during annual WSOS application and renewal window.
 - On-going dosage data collection for all WSOS scholar engagements.
 - On-going pre-assessments, post-assessments and thirty-day follow-up surveys for WSOS event participants. Event data is analyzed and reported on an on-going basis to program staff to promote program improvement and to measure program impact.
 - Annual needs assessment survey alongside renewal application in spring/summer. Needs assessment data is analyzed and reported on an annual basis to program staff and Board members to promote program improvement and to measure program impact.
 - Annual graduate survey to WSOS graduates in winter/spring. Graduate data is analyzed and reported on an annual basis to program staff and Board members to promote program improvement and to measure program impact.
 - Application, renewal and graduation data are stored securely in a scholar database.
 - Annual and on-going literature review and base lining for persistence, graduation and employment statistics in the fields of STEM and Healthcare.
 - Data is compiled and analyzed in annual WSOS Report to the Washington State Legislature.
 - Evaluation team participates in regular board and advisory meetings.
 - Evaluation team responds to staff, board and external party inquiries, as needed.

V. DEVELOPMENT

The WSOS current Board-approved fundraising goal is to raise \$100 million in private funds by 2017. To date, WSOS has raised \$73 million from industry leaders, board members and donors. In FY16, the WSOS board of directors, supported by WSOS staff will pursue the following strategies to achieve its private donor goals.

A. Outcomes

- Secure three (3) pledges totaling at least \$25 million from cornerstone investors (\$5M + gifts).
- Secure 5 pledges totaling at least \$5M from major investors (\$100,000-\$5M Gifts).
- Secure \$1M in partner investments from individuals and corporations (up to \$100,000 gifts).

B. Strategies

- Raise awareness and viability of WSOS as an exciting non-profit workforce investment for individual donors and corporations.
- Develop messages and tools around State match.
- Identify and cultivate cornerstone, major and partner investors to raise \$100 million in private funds by 2017 (\$73 million has been raised to date).
- Partner with similarly situated Washington State STEM organizations to develop and implement a fundraising partnership.
- Partner with colleges and universities to develop and implement an effective fundraising partnership strategy.

C. Tactics

- Partner with Washington STEM and Thrive Washington to develop joint STEM cradle to career fundraising strategy to identify five (5) high-net worth donors and families and three (3) industry leaders to secure cornerstone investment.
- Develop personalized approach to cultivate donor prospect.
- Engage WSOS Board members to participate in donor meetings.
- Work with WSOS Board, staff and champions to identify and research twenty (20) major investors.
- Host at least three industry-focused major gift cultivation events.
- Develop tailored follow-up strategies for prospective donors.
- Work with WSOS Board, staff and champions to identify and research fifty (50) major investor prospects.
- Host at least three industry-focused partner investor gift cultivation events.
- Develop investor packages to encourage investment.
- Produce two (2) large-scale events to provide opportunities for sponsorships by partner investors.
- Integrate sponsorship options into programming efforts to encourage sponsorships by partner investors.

VI. ADVOCACY

As a truly unique public-private partnership, maintaining the positive relationship that exists between WSOS and the state legislature, governor's office and the Washington Student Achievement Council is critical for long-term success. WSOS staff, with support from CSF's Director of Government Relations & Advocacy and the subcontracted lobbyists, will execute a legislative agenda that promotes continuing support for the program among policymakers. During the legislative interim, the government relations team will continue to promote WSOS by providing legislators with opportunities to attend events, meet students from their districts and better understand the goals and outcomes of the program. Each year in December, policymakers will receive a WSOS detailed programmatic report with detail for their legislative district.

A. Outcomes

- All key legislators on Education, Higher Education, Ways and Means committees are aware of the impact of WSOS.
- The Washington State legislature includes funds in its budget to match private contributions, as obligated under statute.

B. Strategies

- Develop key messages which resonate with legislators.
- Raise the visibility of the Scholarship.

C. Tactics

- Meet at a minimum annually with all key Washington State legislators to communicate program updates and findings.
- Include WSOS Scholars (including targeting those from a legislator's district), Board members and other champions in all legislative outreach efforts.
- Publish and produce a high-quality legislative report which clearly documents program enrollment, graduation, retention and renewal efforts.
- Invite key legislators to WSOS events and gatherings.
- Partner with other agencies/organizations including Washington STEM, Independent Colleges of Washington, Council of Presidents, Center for Collaborative Education Results (CCER), and others to highlight the benefits of WSOS.

VII. EXTERNAL COMMUNICATION & ENGAGEMENT

WSOS' Community Affairs Manager, Communications Associate and Direct of Corporate Relations Special Events will ensure that external communication and engagement is robust.

A. Outcomes

- A majority of Washington State high schools and eligible colleges and universities are aware of the scholarship, its goals, eligibility and program facets.

- Washington business community is aware of the goals of the Scholarship.
- More Washingtonians know about WSOS.

B. Strategies

- Increase awareness of WSOS with key audiences and stakeholders.
- Publish and disburse high-quality, audience-specific content.
- Maintain a visible presence at key education, community, business and industry forums.

C. Tactics

- Maintain quarterly ongoing mail and e-communications with key contacts (campus leadership, financial aid, career services offices and science and STEM-related departments).
- Participate in an average of one per month events or conferences.
- Leverage partnerships and channels via CSF at the high school and college level.
- Place five (5) targeted advertisements and earned media at our top five (5) colleges and universities.
- Provide presence and information sharing at sixty (60) Washington trade association/industry gatherings, career fairs and networking events.
- Provide materials to one hundred (100) business leaders about WSOS and industry partnership opportunities.
- Secure twelve earned media articles, editorials or stories in an online or print media publication.
- Grow social media audience and followers by 30% via Twitter, Facebook, and Instagram.
- Develop interactive web content, specifically spotlighting students, industry, and event highlights.
- Provide presence at twelve (12) partner events to highlight and inform audience of WSOS.

VIII. GOVERNANCE

WSOS is a public private partnership created and defined by legislation and governed by an eleven-member Board of Directors, all appointed by the Governor of the State of Washington. Per the legislation, the WSOS Board of Directors sets the overall strategic direction of the program and is jointly administered through an Interagency Agreement between the WSOS Board of Directors, the Washington Student Achievement Council, and a contracted Program Administrator.

The WSOS board establishes short- and long-term program and fundraising goals, provides leadership to ensure fundraising goals are met or surpassed, assesses progress toward goals, assumes stewardship responsibility for the Washington State Opportunity Scholarship investments and finances, and sets policies for the overall management and operation of Washington State Opportunity Scholarship.

A. Outcomes

- WSOS Board members are adequately prepared and briefed to act as an ambassador of the WSOS and its programs.
- WSOS Board members are fully informed of programs, activities, finances, operations of WSOS and the program administrator.

B. Strategies

- Highlight key WSOS program and Scholar successes in a timely manner.
- Effectively report key messages to Board members.

C. Tactics

- Hold quarterly Board meetings.
- Executive Director will conduct one-on-one meetings to update Board members as needed.
- Create easy-to-use dashboard for program and finance updates and outcomes tracking.
- CSF will present as necessary to WSOS board at quarterly board meetings and will appropriate staff available to the board and board committees for questions/discussion.



QUARTER	SUMMER 2015	FALL 2015	WINTER 2015-16	SPRING 2016
PROGRAMMING	MAY-JULY	AUG-OCT	NOV-JAN	FEB-APRIL
<p>Support Services (Co-curricular activities, community-building, personal, scholarship financial aid awareness)</p>	<ul style="list-style-type: none"> • Online onboarding materials specific to HS, CC and 4YR • Onboarding passport: support services documents for each leading school (e.g., map, career center, research, tutoring, counseling, housing, fin aid) • Undergraduate Research Symp. (4) • Various graduation ceremonies, as requested • May Office hours (12) • Social media & newsletter articles • <i>WSOS renewal & evaluation (C1-3)</i> • <i>WSOS C4 award</i> 	<ul style="list-style-type: none"> • Campus welcomes (8) • CC messaging to support transfer plan/preparation (sophomores!) • ABRCMS minority research fair • October Office hours (12) • Social media & newsletter articles • <i>C4 verification</i> 	<ul style="list-style-type: none"> • Office hours (12 per mos) • Promote other CSF scholarships to current scholars (e.g., L1000) • Social media & newsletter articles 	<ul style="list-style-type: none"> • Office hours (12 per mos) • Social media & newsletter articles • Invest in partner internships (e.g. Space Grant, etc.)

<p>Placement (career)</p>	<ul style="list-style-type: none"> • Skills that Shine (1) • Social media & newsletter articles • OpportunityTalks Engineering & Aerospace • <i>WSOS Graduate Survey</i> • Outreach to State legislators 	<ul style="list-style-type: none"> • Promote internship and training opportunities offered by others • Skills that Shine (1) • Social media & newsletter articles • Outreach to State legislators 	<ul style="list-style-type: none"> • Promote internship and training opportunities offered by others • Senior messaging to support placement • Recognize 2015 graduates • WA STEM Summit • Promote all campus career fairs of larger campuses • Attend UW Diversity Fair • LinkedIn Campaign • Skills that Shine (1) • Industry Exploration - Employer tours (6) • Social media & newsletter articles • OpportunityTalks Fundraising Breakfast • Outreach to State legislators 	<ul style="list-style-type: none"> • UW WiSE Conference (Feb) • Spokane Career Partnership Fair (Feb) • Association fairs (e.g., nursing, engineering, CS) • Skills that Shine (1) • Industry Exploration - Employer tours (4) • Social media & newsletter articles • Eat, Drink & Talk Healthcare • Outreach to State legislators
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Promotion

- Imagine Tomorrow (5/29)
- Spokane STEMposium (5/28)
- WA MESA Day (5/17)
- CSF Ace Institute (6/26)

- WA CTE Conference (8/2)
- WA STEM Networks Leadership Conference (8/12)
- UW OMA Daze (9/19)
- UW STEM Exhibition (9/22)
- Seattle GirlGeekCon (10/11)
- WFAA Conference (10/15)
- WA Mathematics Conference (9/?)
- UW Scholarship Fair (10/30)
- TEALS presentation
- First Robotics presentation

- Respond to calls
- Visit college campuses and market scholarship at STEM departments and the entry math and chemistry classes
- Targeted school visits (e.g., TAF, AHS, STEM School)
- WA STEM Summit (12/2)
- TEALS presentation
- Road Map Project convening
- *C5 Application goes live*

- Respond to calls
- Visit college campuses and market scholarship at STEM departments and the entry math and chemistry classes
- Mid-Columbia Sci & Eng Fair (~3/14)
- WA State Science and Eng Fair (3/27)
- MSFT TEALS Field Trip Day (4/1)
- Westsound STEM Showcase (~4/25)
- Road Map Project convening
- *C5 selection*

<p>Exposure & Networking (PR/Advocacy/Fund raising)</p>	<ul style="list-style-type: none"> • Feature in <i>GiveBIG</i> campaign • WSOS Board meeting 	<ul style="list-style-type: none"> • Feature scholar in Microsoft <i>Global Giving</i> campaign • Women in Transportation meetings • WITIA events • GeekWire events • Assorted Hackathon events • WSOS Board meeting 	<ul style="list-style-type: none"> • WA STEM Summit • WSOS advocacy days in Olympia • Women in Transportation meetings • WITIA events • Geekwire events • Assorted Hackathon events • WSOS Board meeting 	<ul style="list-style-type: none"> • MSFT TEALS Field Trip Day • WSOS advocacy days in Olympia • Women in Transportation meetings • WITIA events • Geekwire events • Assorted Hackathon events
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EXHIBIT B. OPTION #1 – SIX MONTH BUDGET

Jul 1 - Dec 31, 2015 Proposed Budget - WASHINGTON STATE OPPORTUNITY SCHOLARSHIP

REVENUE	Jul-Dec 2015	15Budget	Notes
Private Contributions	\$ 21,000,000	\$ 10,000,000	Cornerstone, Major gifts, Geeks Give Back, Microsoft Giving Campaign
Event Sponsorships & Contributions	\$ 500,000	N/A	Breakfast, Geeks Give Back, Microsoft Giving Campaign, etc.
Washington State Match	\$ 17,000,000	N/A	Currently the house budget number
REVENUE TOTAL	\$ 38,500,000	\$ 10,000,000	
Scholarships	Jul-Dec 2015	15Budget	Notes
Scholarship Expense	\$ 13,493,962	\$ 11,637,525	
SCHOLARSHIP EXPENSE SUBTOTAL	\$ 13,493,962	\$ 11,637,525	
WSOS Personnel	Jul-Dec 2015	15Budget	Notes
WSOS Salaries	\$ 279,000	\$ 508,750	Executive Director, Director of STEM Support (Western and Eastern WA),
Personnel Benefits - All Staff	\$ 86,490	\$ 147,538	External Relations Manager, corporate relations director, program officer,
Staff Contingencies	\$ 7,860	\$ -	Bonuses, hiring incentives, etc.
PERSONNEL SUBTOTAL	\$ 373,350	\$ 656,288	
Program Administration Fee - College Success F	Jul-Dec 2015	15Budget	Notes
Occupancy	\$ 15,000	N/A	At \$2500 per month; greatly reduced footprint of space
Research and Evaluation	\$ 46,500	\$ 79,980	Slight increase
Development & Advocacy	\$ 31,000	\$ 98,363	In FY16, \$35K Advocacy; \$25K Devo; Devo reduced from FY15, Advocacy remains steady
Scholarship Select/Award Services	\$ 104,000	\$ 160,444	Increase for additional scholarship recipients for Cohort 5
CSF - Career Success Officer	N/A	\$ 80,625	Functions to WSOS Team
CSF - Leveraged Support Mgr.	N/A	\$ 85,301	Included in Overhead Fee
CSF - IT Support	N/A	\$ 60,469	Included in Overhead Fee
CSF - Finance/Accounting/Administrative	N/A	\$ 102,394	Included in Overhead Fee
CSF - Human Resources Support	N/A	\$ 24,188	Included in Overhead Fee
PROGRAM ADMIN - CSF SUBTOTAL	\$ 196,500	\$ 691,764	
CONSULTING/PURCHASE OF SERVICES	Jul-Dec 2015	15Budget	Notes
Development Counsel	N/A	\$ 45,000	Included in Development/Advocacy Expenses below
Lobbying	N/A	\$ 64,500	Included in Development/Advocacy Expenses below
Media	N/A	\$ 12,000	Included in Administrative Expenses below
CONSULTING/POS SUBTOTAL	\$ -	\$ 121,500	
PROGRAM EXPENSES	Jul-Dec 2015	15Budget	Notes
Overhead on CSF staff	N/A	\$ 73,917	See Overhead above
Overhead on WSOS staff	N/A	\$ 143,311	See Overhead above
Program Expenses	\$ 87,140	\$ 170,000	Costs associated with STEM Support Services for Scholars
Overhead (IT, HR, Admin, Finance, Devo)	N/A		
Occupancy (facility, phone, etc.)	N/A		
Administrative Expenses	\$ 52,550	N/A	General Administrative Costs
Development/Advocacy Expenses	\$ 72,750	N/A	Development events and Lobbying/Advocacy, donor cultivation, etc
PROGRAM EXPENSES SUBTOTAL	\$ 212,440	\$ 387,228	
TOTAL Non-Scholarship Program Expenses	\$ 782,290	\$ 1,947,657	
Operating/Overhead Expenses	\$ 117,344	N/A	15% of Operating Expenses (personnel+CSF R&E, SS, Advancment+Program Fees+Consulting)
TOTAL Program (non-scholarship) Expenses	\$ 899,634	\$ 1,947,657	
TOTAL EXPENSES	\$ 14,393,596	\$ 13,585,182	
DIFFERENCE	\$ 24,106,405	\$ (3,585,182)	

EXHIBIT B. OPTION #2 – FY16 ANNUAL BUDGET

FY16 PROPOSED BUDGET - WASHINGTON STATE OPPORTUNITY SCHOLARSHIP

REVENUE	16Proposed	15Budget	Notes
Private Contributions	\$ 21,000,000	\$ 10,000,000	Cornerstone, Major gifts, Geeks Give Back, Microsoft Giving Campaign
Event Sponsorships & Contributions	\$ 500,000	N/A	Breakfast, Geeks Give Back, Microsoft Giving Campaign, etc.
Washington State Match	\$ 17,000,000	N/A	Currently the house budget number
REVENUE TOTAL	\$ 38,500,000	\$ 10,000,000	
Scholarships	16Proposed	15Budget	Notes
Scholarship Expense	\$ 13,493,962	\$ 11,637,525	
Scholarship Liability			
SCHOLARSHIP EXPENSE SUBTOTAL	\$ 13,493,962	\$ 11,637,525	
WSOS Personnel	16Proposed	15Budget	Notes
WSOS Salaries	\$ 558,000	\$ 508,750	Executive Director, Director of STEM Support (Western and Eastern WA),
Personnel Benefits - All Staff	\$ 172,980	\$ 147,538	External Relations Manager, corporate relations director, program officer,
Staff Contingencies	\$ 15,720	\$ -	Bonuses, hiring incentives, etc.
PERSONNEL SUBTOTAL	\$ 746,700	\$ 656,288	
Program Administration Fee	16Proposed	15Budget	Notes
Occupancy	\$ 30,000	N/A	At \$2500 per month; greatly reduced footprint of space
Research and Evaluation	\$ 93,000	\$ 79,980	Slight increase
Development & Advocacy	\$ 62,000	\$ 98,363	In FY16, \$35K Advocacy; \$25K Devo; Devo reduced from FY15, Advocacy remains steady
Scholarship Select/Award Services	\$ 208,000	\$ 160,444	Increase for additional scholarship recipients for Cohort 5
CSF - Career Success Officer	N/A	\$ 80,625	Functions to WSOS Team
CSF - Leveraged Support Mgr.	N/A	\$ 85,301	Included in Overhead Fee
CSF - IT Support	N/A	\$ 60,469	Included in Overhead Fee
CSF - Finance/Accounting/Administrative	N/A	\$ 102,394	Included in Overhead Fee
CSF - Human Resources Support	N/A	\$ 24,188	Included in Overhead Fee
PROGRAM ADMIN - CSF SUBTOTAL	\$ 393,000	\$ 691,764	
CONSULTING/PURCHASE OF SERVICES	16Proposed	15Budget	
Development Counsel	N/A	\$ 45,000	Included in Development/Advocacy Expenses below
Lobbying	N/A	\$ 64,500	Included in Development/Advocacy Expenses below
Media	N/A	\$ 12,000	Included in Administrative Expenses below
CONSULTING/POS SUBTOTAL	\$ -	\$ 121,500	
PROGRAM EXPENSES	16Proposed	15Budget	
Overhead on CSF staff	N/A	\$ 73,917	See Overhead above
Overhead on WSOS staff	N/A	\$ 143,311	See Overhead above
Program Expenses	\$ 174,280	\$ 170,000	Costs associated with STEM Support Services for Scholars
Administrative Expenses	\$ 105,100	N/A	General Administrative Costs
Development/Advocacy Expenses	\$ 145,500	N/A	Development events and Lobbying/Advocacy, donor cultivation, etc
PROGRAM EXPENSES SUBTOTAL	\$ 424,880	\$ 387,228	
TOTAL Non-Scholarship Program Expenses	\$ 1,564,580	\$ 1,947,657	
Admin/Operating Costs	\$ 234,687	N/A	15% of Operating Expenses (personnel+CSF R&E, SS, Advancement+Program Fees+Consulting)
Total Program (non-scholarship) Expenses	\$ 1,799,267	\$ 1,947,657	
TOTAL EXPENSES	\$ 15,293,229	\$ 13,585,182	
DIFFERENCE	\$ 23,206,771	\$ (3,585,182)	

Appendix

2015 Schedule for WSOS Board Meetings

**UW Undergraduate Research Symposium Participant
Abstracts**



2015 WSOS Board Meetings

September 23 - Wednesday

December 15 - Tuesday



Undergraduate Research Symposium May 15, 2015 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

Balcony, Easel 98

11:00 AM to 1:00 PM

Baby It's Cold Outside: Clinical and Environmental Factors Impacting Neonatal Thermoregulation??*Rachel Rich, Senior, Nursing**UW Honors Program**Maria Alvarado, Senior, Nursing**UW Honors Program**Mentor: Karen Thomas, Nursing*

Hypothermia in the neonatal intensive care unit (NICU) is associated with adverse consequences in neonatal development and increases in morbidity and mortality rates. This study is researching the impacts of clinical and environmental factors on thermoregulation of premature and high-risk neonates. We are examining the effects of delayed cord clamping (DCC) on admission temperature as well as the environmental thermal challenges that neonates encounter in the NICU. Within the last year, the DCC practice has been implemented at the University of Washington Medical Center (UWMC). This practice may increase the time from birth to the infant's transfer to the NICU and may be associated with increases in hypothermic admission temperatures. The study population is NICU admissions at UWMC. We will be collecting data on the axillary temperatures on neonates with DCC and comparing it to data collected on neonates without DCC. Additionally, we will be comparing the contemporary data to data collected in a similar fashion in the same time frame last year, prior to the implementation of DCC. We anticipate that the neonates who had DCC will be more hypothermic than the temperatures of neonates who did not have this intervention. Determining if DCC is related to increased hypothermic admission temperatures will allow staff to utilize contemporary evidenced-based practice research to make clinical decisions. Additionally, we will be creating a thermal map of the NICU by measuring ambient, humidification and radiant temperatures in patient rooms on the unit. The thermal map will allow staff to appreciate the thermal environment that may challenge the neonate. Determining the impacts of clinical and environmental factors will allow us to make best-practice decisions in order to decrease morbidity and mortality rates associated with hypothermic NICU admission temperatures.

POSTER SESSION 1

Commons West, Easel 10

11:00 AM to 1:00 PM

Effects of Sea Star Wasting Disease on the Intertidal Community of the Puget Sound*Jeremy Axworthy, Sophomore, Aquatic and Fisheries Science, Seattle Central College**Judilyn Rodriguez, Sophomore, Opticianry, HIHIM, Seattle Central College**Niloufar Ghodsian, Sophomore, Environmental Health, South Seattle Community College**Mentor: Ann Murkowski, Math Science Division, North Seattle Community College**Mentor: Marina Halverson, Biology, Seattle Central College*

The greatest recorded outbreak of sea star wasting disease is currently ravaging populations of over 20 sea star species along the west coast of North America, including *Pisaster ochraceus*. As a keystone predator, *P. ochraceus* consumes and regulates populations of mussels and barnacles that compete for space with other intertidal organisms. To observe changes in community structure of the intertidal zone, transect surveys were conducted over a period of eight months at field sites in West Seattle. Quadrats (50cm x 50cm) were randomly placed along transect lines running parallel and perpendicular to the shore. Community structures were measured by either counting organisms (mussels, snails, limpets and anemones) or estimating percent coverage (barnacles and algae). Preliminary results suggest that barnacle and mussel populations are neither increasing nor decreasing due to the absence of their main predator. The results may be because of a lack of sufficient baseline data for barnacle and mussel populations in the area or because not enough time has passed to see a significant change in population size. However, the data collected may be used as a baseline for further documentation of the progression of sea star wasting disease. Diseases that affect keystone predators may have effects on local ecosystems as well as cascading effects on surrounding community structures. Changes in the delicate balance of intertidal ecosystems can affect neighboring offshore ecosystems that people in the Puget Sound and other coastal populations rely heavily upon for subsistence and maintaining a certain quality of life.

POSTER SESSION 1

Commons West, Easel 29

11:00 AM to 1:00 PM

The Effect of Spatial Distribution of Trees within a Conifer Forest on Seed Production and Seedling Dynamics of *Tsuga heterophylla*

Olivia Davis, Senior, Biology (Ecology, Evolution & Conservation)

Mentor: Janneke Hille Ris Lambers, Biology

What role does the spatial distribution of trees within a conifer forest have on seed production and seedling dynamics of *Tsuga heterophylla* (Western hemlock)? This question is important to understanding how climate change may cause this species to respond to climate change, given that tree seedling recruitment strongly influences population dynamics. To answer this question, we examined seed and seedling dynamics relative to adult trees in the Wind River Dynamics Forest Plot (WA). Specifically, we collected seeds from 40 seed traps located within 20x20 meter quadrats within the Wind River plot – with seed trap contents sorted by species and quality (viable vs. unfilled, not viable). We also surveyed seedling densities (1st year germinants) at seedling quadrats adjacent to each seed trap. We next compared seed densities (viable and total) and seedling densities to the abundance (basal area) of trees 20 meters from seed trap / seedling quadrat pairs, the average distance between trees in each quadrat, and species richness and evenness. I hypothesize that total seed production will be greater with increased basal area, but that there might be a decrease in the number of viable Western Hemlock seeds (due to resource competition). Similarly, seedling recruitment should increase with seed input, but recruitment rates decline with density (density-dependence). I additionally predict that the number of filled seeds (total viable seed production) will increase with increasing species richness and evenness, as species diversity has been shown to have a positive impact on productivity. Continued measurement of seed and seedling dynamics in the Wind River plot is planned for many years, which will allow for a better understanding of the patterns in forest dynamics and forest recruitment, particularly with the possibility of climate change.

POSTER SESSION 1

Commons West, Easel 20

11:00 AM to 1:00 PM

Study System for Testing Local Adaptation in Microbial Mutualism

Benjamin (Ben) Pham, Senior, Biology (Bothell Campus)

Jessica Kim, Senior, Biology (Molecular, Cellular & Developmental)

Mentor: Kristina Hillesland, Biological sciences, School of STEM

Mutualism, a beneficial relationship between species, causes coevolution. Coevolution is a reciprocal adaptation that can cause local adaptation where a population has better relative fitness when paired with species from its local environment. Examples of mutualism are known, however a time-shift approach during the early phases of a novel mutualism creates opportunity to better understand evolutionary forces and species interactions. An obligate mutualism, between the sulfate-reducing bacteria *Desulfovibrio vulgaris* and the methanogen *Methanococcus maripaludis*, was established in the lab for rigorous and controlled testing. An example of obligate mutualism is that in order to grow, *D. vulgaris* ferments lactate, to produce acetate and H₂ as a byproduct, and *M. maripaludis* consumes that hydrogen to produce methane. We will assay relative abundance by using the FREQ-Seq procedure, which amplifies loci targets that are different amongst *D. vulgaris* populations, to test if mutualism facilitated significant contrast in variations of fitness between a locally adapted pair and a *D. vulgaris* that evolved in another pair. Also, FREQ-Seq uses Illumina sequencing, which records real-time frequencies of allele targets throughout the population over time. We grew 6 co-cultures that have potential for local adaptation, and then determined initial ratios by cell count samples from those co-cultures. We then grew three ratios of each competition environment containing one adapted pairing with a *D. vulgaris*, which is from different co-cultures. To minimize non-genetic effects, we transferred cultures twice in the same environment before transferring the cultures into the next environment. Our prediction followed the logic that the fitness of the *D. vulgaris* in the locally adapted pairing should be higher than the fitness of a *D. vulgaris* from another evolved pairing. Evidence of local adaptation in a syntrophic mutualism may provide insight towards microbial communities, which yield methane, of the human body and waste treatment facilities.

POSTER SESSION 1

Balcony, Easel 104

11:00 AM to 1:00 PM

The Role of Emilin2 in Early Zebrafish Heart Development

Jasmine Kim, Senior, Biology (Molecular, Cellular & Developmental)

Mary Gates Scholar, UW Honors Program

Mentor: Peter Hofsteen, Pathology, Institute of Stem Cell and Regenerative Medicine

Mentor: Charles Murry, Pathology

Cardiovascular diseases are the leading cause of death worldwide. If the genes that regulate the heart are better understood, new therapies for congenital heart defects and for the repopulation of injured hearts with new tissue can be designed. Elastic microfibril interface located protein 2 (EMILIN2) is one potential gene involved in heart development. EMILIN2 was identified through genome-wide microarray (RNA expression), chromatin immunoprecipitation followed by deep sequencing (ChIP-Seq), and quantitative proteomics analysis over the course of human pluripotent stem cell differentiation into cardiomyocytes. Despite EMILIN2's association with the heart, there is little research on its dynamic expression in early heart development. By using a CRISPR/Cas9 genome editing system to create *emilin2* zebrafish mutants and observing how those zebrafish hearts develop, the role of EMILIN2 can be determined. CRISPR/Cas9 is an evolutionarily conserved genome editing system that can create frame shift mutations in a gene of interest. There are two components to this system (1) a guide RNA (gRNA) and (2) Cas9 endonuclease. *Emilin2* gRNA recognizes the target DNA sequence via complimentary base pairing. The Cas9 endonuclease then cleaves the target sequence, resulting in a double stranded break, which is then repaired by non-homologous end joining. The *emilin2* gRNA used here targeted the 5' untranslated region in order to ensure complete knockout. In *emilin2* mutants, there was an observed phenotypic difference when compared to wild type zebrafish. The *emilin2* mutants showed cardiac defects with pericardial effusion in addition to hemorrhaging ventral to the common cardinal vein. Recovery of a phenotype will be possible once the F₁ generation has matured.

POSTER SESSION 1

Commons East, Easel 64

11:00 AM to 1:00 PM

Development and Validation of a 3D Printed Chemical Screening System for Osteoactive Compound Discovery in the Regenerating Zebrafish Tail Fin

Adrian Monstad-Rios, Senior, Biochemistry

NASA Space Grant Scholar, Undergraduate Research Conference Travel Awardee

Mentor: Ron Kwon

In vivo chemical screens represent a powerful strategy for bone pathway discovery. This project seeks to utilize the re-

generating zebrafish tail fin, a rapid model of bone redevelopment, in such screens. Unlike embryonic zebrafish, adult zebrafish require a relatively large water volume for housing. This makes adult zebrafish costly for large-scale screens due to the large compound quantities necessary to achieve an active concentration in the water. To overcome this hurdle, the objective of this study was twofold: 1) develop a 3D printed screening system that enables rapid, efficient, and cost-effective chemical administration in adult zebrafish, and 2) validate its potential to detect a clinically-relevant osteoactive compound during fin regeneration. In this study, we developed a novel 3D printed screening system made up of dual-compartment mesh-bottom inserts for housing individual fish. The inserts consist of a large volume upper compartment that tapers into a low volume lower compartment. The inserts nest in 6 liter tanks, allowing the fish to swim freely in the upper compartment. During dosing, the inserts are placed into custom 9-well screening plates for chemical administration (via immersion). For fin regeneration studies, adult zebrafish were anesthetized in MS-222 and subjected to 50% tail fin amputation using a straight razor blade. The fish were dosed for one hour per day beginning the first day post-amputation. After 8 days the fish underwent microscope imaging in order to determine bone regrowth. Cyclopamine was administered and resulted in dose dependent inhibition of regrowth, validating the systems ability to detect a known inhibitor of fin regeneration. Administration of Dorsomorphin, an inhibitor of mammalian bone development with unknown effects on fin regeneration also inhibited regrowth. Collectively, this study develops a novel screening system in adult zebrafish and validates its ability to detect clinically relevant compounds, opening the door to large-scale screening efforts.

POSTER SESSION 1

Balcony, Easel 111

11:00 AM to 1:00 PM

Development of a Scalable In Silico Model of Human Embryonic Stem Cell-Derived Cardiomyocyte Action Potentials

Kamran Ali, Senior, Bioengineering

Mary Gates Scholar, UW Honors Program

Mentor: Michael Laflamme, Pathology

Myocardial infarctions (heart attacks) produce currently irreparable damage to heart muscle and diminish cardiac efficiency and output. The transplantation of human embryonic stem cell-derived cardiomyocytes (hESC-CMs) has been proposed as a potential therapy for such infarctions. Prior studies have shown that hESC-CMs grafts can electrically integrate with host tissue in guinea pig acute and chronic infarct models. However, the risk of arrhythmias following hESC-CM transplantation in injured hearts remains inadequately stud-

ied. To better guide hypothesis development and drug screening, we are developing an in silico model of action potentials in hESC-CMs. We hypothesize that the characteristics of these simulated action potentials will reliably mimic those found in vitro and so provide insight on the presence of arrhythmias. To test this hypothesis, we have constructed an action potential model for a single hESC-CM based on similar models of other cell types. We utilize literature values and original electrophysiological recordings of parameters such as action potential duration and ionic currents (sodium, transient outward potassium, etc.) to generate hESC-CM behavior within the model. To verify action potential behavior in the model, actual cells will be treated in vitro with current blocking drugs and characterized through patch clamp experiments. The computational model should agree with the results of these experiments after appropriate modulation of parameters. Finally, we will extrapolate the model to a sheet of cells to provide a more accurate simulation of the high purity hESC-CM grafts used in transplantations and to predict action potential propagation between cells. The information generated by this model may provide insight on factors that promote or inhibit arrhythmias, leading to compelling new in vitro experiments. We anticipate that use of this model will minimize the number of animals needed in preclinical studies and hasten the clinical translation of hESC-CM transplantations.

SESSION 1A

LEAVING PARADISE: THE REALITIES OF MICRONESIAN MIGRATION

Session Moderator: Holly Barker, Anthropology

171 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

The Stigmas of Mental Illness in Micronesian Culture

Rachael Tamngin, Junior, Anthropology

Mentor: Holly Barker, Anthropology

How do stigmas associated with mental illness shape the culture in which mental illness is perceived and treated in Micronesian communities? Mental illness elicits responses of different sorts throughout the world. Within the United States, there is a stigma surrounding mental illness that separates those with this illness from the rest of the society. In health care, mental illness is segregated into another field of study, apart from fields of study associated with illnesses in the rest of the body. With the influence of Western Society on Micronesian culture, it is difficult to explore possible stigmas revolving around mental illness pre-colonization. It is possible, however, to compare stigmas associated with mental illness in these communities through interviews with

younger and older generations to see possible progressions of perspectives around mental illness over time. Comparing current statistics with statistics from past research primarily during the 1960's, using data from Francis Hezel's research in Micronesian countries, this research communicates trends of mental illness in Micronesian communities.

SESSION 1A

LEAVING PARADISE: THE REALITIES OF MICRONESIAN MIGRATION

Session Moderator: Holly Barker, Anthropology

171 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Leaving Paradise: The Realities of Micronesian Migration

Carmen Borja, Junior, Political Science

UW Honors Program

Randizia Crisostomo, Junior, Anthropology

Rachel Hoffman, Senior, Society, Ethics, & Human Behavior (Bthl)

Layla Afu, Senior, Political Science

Rachael Tamngin, Junior, Anthropology

Shaylin Salas, Senior, Environmental Science & Resource Management

Mentor: Holly Barker, Anthropology

How has migration and culture affected Micronesians as students? What has been the Micronesian experience when migrating to the United States? As families migrate to America, it is important to see what cultural traditions, and aspects, are brought from their home islands. Micronesia has the highest U.S. military recruit per capita- even much higher than any rates within the U.S. mainland. Consequently, for many Micronesian families that migrate to the U.S. for military purposes, education is a main focal point for the next generation. Whether for military or other reasons, education is a major factor that influences their migration to the U.S. in service to the military. The purpose of this project is to raise cultural awareness of Micronesian students, and Micronesians on and off campus. This presentation will enlighten cultural practices, journeys, historical baggage, and current challenges in the face of migration. Methods of research include oral and written interviews by Micronesian students and community members, images by Palauan photographer Desiree Gross, and other forms of artful expressions such as Micronesian material culture.

SESSION 1B

PHYSIOLOGY & DISEASE

*Session Moderator: Sarah Pierce, Medical Genetics and
Genome Sciences*
228 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

**Translational Study Evaluating the Mechanisms of
Improved Glucose Homeostasis and Type II Diabetes
Mellitus Remission after Bariatric Surgery using
Ossabaw Miniature Swine Animal Model**

*Ky Ngo, Senior, Biology (Physiology), Biochemistry
UW Honors Program*

Mentor: David Flum, Surgery

Mentor: Vlad Simianu, Surgery

Over 29.1 million Americans have Type II Diabetes Mellitus (T2DM). Roux-en-Y Gastric Bypass (RYGB) achieves remission of T2DM in approximately 84 percent of cases, but the improvement in glucose homeostasis precedes the significant weight loss associated with the procedure. The mechanisms behind the ‘weight-independent’ correction of glucose homeostasis remain unclear, in part because large animal models of naturally occurring insulin resistance (IR) have been lacking. The purpose of the study was to examine the mechanisms behind improved glucose homeostasis and T2DM remission after bariatric surgery using a large animal model. Thirty-two Ossabaw swine received obesogenic diets and underwent RYGB (n=13), gastrojejunostomy (GJ) (n=10), gastrojejunostomy with duodenal exclusion (GJD) (n=7), or sham operations (n=2). Intravenous Glucose Tolerance Tests (IVGTT) and Meal Tolerance Tests (MTT) were performed pre- and post-operatively. Results were compared with 21 control Ossabaws that, received a regular diet, did not undergo an operation and received a one-time IVGTT and MTT. IR in this model was defined as the Homeostasis Model Assessment IR (HOMA-IR) >2 standard deviation above the regular diet group mean. Obesogenic-diet Ossabaws weighed more and 65.6% (n=21) had greater IR than controls. There was a positive correlation between weight and HOMA-IR ($R^2=0.08$, $p=0.05$). RYGB was the only operation that induced weight loss, and resulted in increased in insulin/glucose area under the curve during MTT at 2 weeks (0.7 ± 0.29) and 8 weeks (0.46 ± 0.2) compared with baseline (0.28 ± 0.07) ($p=0.015$, $p=0.042$ respectively). The largest reduction in IR was noted in the pigs that had the highest baseline IR. In Ossabaw swine, RYGB was the only procedure to induce both weight loss and IR improvement as measured by MTT. This animal models suggests a combination of upper and lower gut mechanisms improve glucose homeostasis postoperatively, and motivates further investigation into gas-

tric and distal intestinal control of these effects.

SESSION 1D

HUMAN-COMPUTER INTERFACES AND ROBOTICS

*Session Moderator: Werner Stuetzle, Statistics, Computer
Science*

234 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

**Track'd: A Responsive Website That Helps Students
Find Important Events and Services around Campus**

*Yizhe (Louisa) Fan, Senior, Bus Admin (Oper & Supply
Chain Mgmt), Informatics (Human-Computer Interaction)
Jenny Chen, Junior, Informatics (Human-Computer
Interaction)*

Michelle Le, Senior, Informatics

Gabriela Nikolova, Senior, Informatics

Shengyao Qian, Senior, Informatics

Mentor: Nam-ho Park, Information School

As students from the University of Washington, we want the best for our campus. However, we've noticed that a lot of the information about campus events, organizations and other services are all over the place and difficult to find in one centralized location. Also, it's incredibly difficult to find things that match up to your interests if you don't already have friends or connections within existing organizations. That led us to wonder, "how can we aggregate and visualize information about events and services on campus so that students can make friends with common interests and learn more about the resources the UW has to offer?" We conducted many interviews and user surveys and ultimately decided to create a responsive web application that targets three main audiences: first, incoming and prospective students; secondly, students with access needs; and lastly, registered student organizations and campus services that want to advertise and become more well-known. So far, we've conducted several user interviews to access the viability of our project, and we're currently finishing up user testing on our wireframes and high-fidelity prototypes. Results from our testing as well as a beta-stage application will be shared.

SESSION 1F

EXPERIMENTATION IN SCIENCE AND ENGINEERING

*Session Moderator: Dawn Lehman, Civil And
Environmental Engineering*

242 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Oxidizing Aldehydes with Water: Catalysts for the Aldehyde-Water Shift

Jeremy Tran, Senior, Biochemistry, Chemistry

Goldwater Scholar; NASA Space Grant Scholar; UW

Honors Program

Mentor: Karen Goldberg, Chemistry

Mentor: Timothy Brewster

Carboxylic acids are ubiquitous in chemistry and find use in a variety of applications in both industry and in academic research, including as polymer precursors, synthetic building blocks, and food preservatives. Modern routes to synthesize these compounds often involve harsh conditions or reagents harmful to both the environment and human health. An alternative synthetic route is the aldehyde-water shift reaction; in this relatively unknown reaction, an aldehyde is oxidized by water to a carboxylic acid with release of hydrogen gas. The use of water as both solvent and reagent and the mild reaction conditions could potentially reduce the impact of aldehyde oxidation on the environment. Two major classes of half-sandwich catalysts for this reaction have been investigated for activity in catalyzing this reaction with a variety of aldehyde substrates: one series of catalysts features iridium, rhodium, and ruthenium metal centers with bipyridine ligands, while the other series features diamine ligands on ruthenium. Using ^1H NMR and GC-FID to analyze reaction products, many of the catalysts were observed to disproportionate aldehydes to alcohols and carboxylic acids in competition with the desired oxidation to carboxylic acids. Mechanistic studies and catalyst optimization for selective dehydrogenative oxidation are presented.

SESSION 1M

MCNAIR SESSION - WORKING TOWARDS A BETTER UNDERSTANDING OF HOW HUMANS INTERACT THROUGH WALKING, THINKING, COMMUNICATING AND FEELING

Session Moderator: Gabriel Gallardo, Geography

295 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Mathematics in Service and Action: Problem Solving for Youth in Transition

Mark Bennett, Senior, Mathematics

McNair Scholar

Mentor: Sara Billey, Mathematics

Being of service is enriching to say the least. It can yield a sense of community, usefulness, and purpose. As students of mathematics, this endeavor is not always emphasized. We sought such an opportunity with a local non-profit. Young Adults in Transition, or YAIT, is a transitional housing program funded and established by the YMCA. The program takes in homeless youth from the ages of 18-24; providing them with at most two years of housing. These youth need more than a place to stay. Case managers at YAIT work with these youth with the hopes of helping clients develop skills that will reinforce their stability. Chores at YAIT embody these goals. They provide a way for clients to give back, as well as an opportunity to practice having responsibilities. If a client fails to do their assigned chores, they are given a penalty. Currently chores are selected in an arbitrary fashion. The cost of this arbitrary decision is that some participants will be given more responsibilities, while others less, which results in more or less penalties. The case managers at YAIT have asked us to find a more mathematical approach. Hence, our objective is to produce a years' worth of weekly chore schedules while minimizing the number of extra chores any participant must do yearly. We used an approach that utilized Latin squares. This approach was successful in that it allowed us to produce 52 weekly schedules that minimized the number of extra chores any one participant must complete. Moreover, this mathematical approach ensures chore assignment is a non-personal endeavor. This is to say that chore assignment is more tolerable. This talk is based on joint work with Laura Tackaberry-Barker, Kevin Ma, and Adam Mohr.

SESSION 1N

FROM CELLS AND MOLECULES TO SYSTEMS NEUROSCIENCE

Session Moderator: *Horacio de la Iglesia, Biology*
389 MGH

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Identification of Cellular Processes Associated with Aging across the *Drosophila* phylogeny

Ariana Samuelson, Senior, Biochemistry

NASA Space Grant Scholar

Mentor: Daniel Promislow, Department of Pathology

Mentor: Jessica Hoffman, University of Georgia

Age is the largest risk factor associated with mortality and morbidity. However, while many studies have determined specific molecules and pathways associated with age-related decline, few have attempted to discover the global changes that influence aging. In order to address this question, we have utilized a comparative approach involving 11 species of fruit flies in the genus *Drosophila*. These species have extremely variable natural lifespans. To discover the underlying mechanisms that result in these differences in longevity, we have employed the use of metabolomics. The metabolome consists of all the small-molecules present in an organism's body. Metabolomics uses mass spectrometry, nuclear magnetic resonance or gas chromatography to quantify these molecules. We have measured lifespan and collected flies for metabolomics at five, 31, and 63 days of age. Samples were then run through a mass spectrometer for metabolite identification. Numerous metabolites were found to be associated with age, species, and sex, and many of these factors are also linked to specific metabolic pathways. In our future work, we will manipulate the metabolites found to be significantly associated with age and observe whether there are changes in longevity. Identifying specific cellular processes influencing longevity could then provide targets for potential therapies to alleviate the detrimental effects of aging.

POSTER SESSION 2

Commons West, Easel 19

1:00 PM to 2:30 PM

VROOM: Designing a Head-Up Display for Automobiles

Stephen Ramirez, Senior, Informatics

David Phillips, Senior, Informatics (Human-Computer Interaction)

Marissa Ho, Senior, Informatics

Jose (Danny) Gonzalez, Senior, Informatics: Info Assurance & Cybersec

Philip Rudio, Senior, Informatics

Mentor: Nam-ho Park, Information School

Head-up display (HUD) technology is slowly emerging in the commercial automobile industry. HUD systems utilize projection technology or custom hardware to display information (an automobile's speed, fuel levels, temperature, etc.) visually on a glass pane. This technology allows for rapid information recognition so drivers can keep their focus on the road and the display itself has the added benefit of being semi-transparent, so it won't fully obstruct the view through the glass pane. Today, over 30 different automobile manufacturers are researching and implementing HUD technology in their automobiles. VROOM is partnering with UW EcoCar to create a head-up display user interface for their competition car, which will increase the visibility of energy consumption and car diagnostics to drivers while enabling a safer driving experience. We believe VROOM can answer questions consumers have about the safety and usability of existing HUD technology. For this project, various methods of research such as user interviews, user surveys, and meetings with individuals involved in head-up display research and development were conducted to gather data and feedback that enabled our design process. Our project, much like the existing HUD product market, is constantly changing and evolving as we learn more about how drivers expect to interact with this kind of technology.

POSTER SESSION 2

MGH 241, Easel 139

1:00 PM to 2:30 PM

Robot-Assisted Sensation Mapping for Targeted Reinnervation

Sharon Newman, Senior, Bioengineering

UW Honors Program

Mentor: Blake Hannaford, Electrical Engineering

Targeted reinnervation is a surgical technique that instills a sense of touch in an amputee's non-existent, "phantom" limb. This allows a person living with amputation to feel sensations such as pressure through their prosthetic device, offering intuitive and high performance movement. However, current methods to map the vast cutaneous information at the targeted sites are manually conducted, and thus are imprecise and tedious. This work offers an automated method to robotically map these sensations, removing the potential bias and

inaccuracies from manual mapping. The presented work is a package of scripts that detect target sites and commands a surgical robot, Raven-II, to methodically explore the thresholds and locations of sensations at the target sites. Using a custom-made monofilament attachment to the Raven-II, robot trajectory testing was conducted with randomized target locations (including sham trials) on varying curvatures. Future tests include testing with human subjects to compare precision with manual sensory mapping. Quantifying and providing high resolution sensory input is a remarkable contribution. Even a single point of cutaneous feedback allows a person to intuitively confirm grasp of an object, and adjust pressure accordingly. This automated mapping process is truly exciting, as it enables improved multi-disciplinary methods in systems with advanced signal processing—not only for prosthetics.

POSTER SESSION 2

Commons West, Easel 30

1:00 PM to 2:30 PM

A Content Analysis of College through the Eyes of Twitter

Aubrey Gower, Junior, Extended Pre-Major

Mentor: Megan Moreno, Pediatrics, Seattle Children's Research Institute

Social media, as a source for social connection and information, through previous research has shown to have an influence on attitude, intention, and behavior of its users. Studies have shown that almost one-third of college aged students use Twitter and 20% use it daily, though little is known about the content related to college. This increased use of Twitter then poses a great potential influence on related attitudes, intentions, and risky behavior and eventually overall health among college students and pre-college students. The purpose of this study is to investigate the health-related content and followers of Twitter pages in relation to college. We will identify five handles named with the word "college" that have the greatest number of followers. We will then conduct content analysis of tweets (140 letter statements) using a codebook for specific health related variables including references to alcohol, marijuana, other illicit substances, financial issues, poor sleep, relationships, and sexual acts or conduct. Findings will provide a better picture of the content being perpetuated by Twitter pages that, based on their titles, suggest a representation of college. Second, a sample of each pages' followers will be coded for those that display age, enrollment in a college or high school, and affiliation with a sorority or fraternity to understand the demographics of these followers. I anticipate my results will show a high frequency of alcohol and sexual conduct related tweets being posted based on common portrayal of both in relation to college among other media, including movies and music videos. In representing college through social media, these pages may reinforce societal norms regard-

ing risky health behaviors and college among its followers. Further studies could evaluate the effect on attitudes of college students that view content over Twitter related to college.

POSTER SESSION 2

MGH 241, Easel 138

1:00 PM to 2:30 PM

Real Time Graphics Library for Virtual Reality Applications

Muhammad Osama, Senior, Electrical Engineering

Yuxiang Chen, Senior, Electrical Engineering

Siren Xu, Senior, Electrical Engineering

Xinyi Chang, Senior, Electrical Engineering

Mentor: Allan Ecker, Electrical Engineering

Virtual Reality (VR) is a computer-simulated environment that can simulate physical presence, often through sight, in places in the real world or in the virtual world. Within virtual reality, dizziness is common due to the delayed response of graphics that appear on the screen. This delayed response is due to the slow speed of rendering of the graphics, and the layers of software/hardware these images have to go through to finally appear on the screen. Our research project focused on rendering and generating these graphics for virtual reality applications at the bare-metal with a real-time constraint to speed up the entire process thereby decreasing the effects of dizziness in the virtual world. The open-source Graphical Processing Unit (GPU) in the Raspberry Pi allowed us to achieve the maximum capabilities to optimize certain aspects of the project to determine the best possible route to a real-time graphics library for virtual reality applications.

POSTER SESSION 2

Commons East, Easel 62

1:00 PM to 2:30 PM

Thrust Stand for High Powered Electric Propulsion In-Space Thrusters

Brittney Dodson, Senior, Physics: Comprehensive Physics

Mentor: Robert Winglee, Earth And Space Sciences

Mentor: Ian Johnson, Aeronautics and Astronautics

For the past 60 years, chemical propulsion has been the standard for in-space missions and is the most common method of in space propulsion. While chemical thrusters have proved reliable, disadvantages include low exhaust velocities (2-5 km/s) and poor mass utilization, both resulting in unfeasibly long mission timelines for destinations far from Earth. The Advanced Propulsion Lab (APL) strives to develop techniques that can provide substantial reductions in cost and duration by increasing the exhaust velocities and mass efficiency of in-space thrusters. Specifically, the APL researches

electric propulsion systems that utilize electric and magnetic fields to ionize and accelerate plasma to velocities more than an order of magnitude higher than chemical thrusters. Currently, two variations of the High Power Helicon thruster are being tested. The Solid Fuel High Power Helicon uses a 100J Pulsed Plasma thruster as the propellant source and a 125kW antenna to ionize and accelerate the exhaust. The Double Gun Configuration of the High Power Helicon uses Argon gas propellant and two 35kW thrusters firing simultaneously. Both thrusters are design for long duration, high thrust missions. These could include a manned mission to Mars or the asteroid belt, or transporting cargo to the outer solar system. A pendulum thrust stand was designed and built to measure the impulse-bit and total thrust output of these thrusters. The thrust stand uses a metallic target placed downstream of the thruster, and a displacement sensor to measure the deflection angle of the pendulum. The angle vs. time graph can be modeled by a 2nd order differential equation, resulting in a measurement of the thrusters impulse. Results will be shown comparing the performance of both systems at varying configurations to determine the operating regime for maximum efficiency.

POSTER SESSION 2

MGH 241, Easel 137

1:00 PM to 2:30 PM

Semantically Labeling the 3D Virtual World

Aaron Nech, Junior, Computer Engineering

UW Honors Program

Mentor: Richard Newcombe, CSE

Through a large increase in 3D sensing becoming available to consumers, we have been motivated to tackle the problem of a computer understanding 3D scenes as humans do. In particular, one central sub-problem is identifying which objects are present in a 3D scene. To solve this problem in a general setting, we propose using prediction algorithms learned over a large storage of labeled 3D scenes. To produce such a set of data, we require a novel 3D labeling tool that is easily expandable and freely accessible by researchers around the world. In our work, we create this tool to provide the ability to add semantic labels to an otherwise static view of the virtual world. For example, after scanning an office room the entirety of that room will be reconstructed into a static 3D model. The model can then be annotated to specify precisely which parts of that 3D geometry correspond to objects such as "coffee cup" or "office chair." With emerging rendering power in web browsers, this project targets the web platform utilizing a full 3D viewer to manipulate and label 3D scenes. In future development, this tool will be expanded to provide the ability to add rigging mechanics and other real world object descriptors. For example the ability to tell that a office chair can pivot at the base. The semantic labels and infor-

mation produced by this tool can then be used in the broader context of the 3D object identification problem for future unseen 3D geometries.

POSTER SESSION 2

Commons West, Easel 32

1:00 PM to 2:30 PM

Charter Schools: Geographical and Population Demographics

Quyen Truong, Sophomore, Computer Science, South Seattle Community College

Hassan Abdi, Junior, Computer Science

Mentor: Ravi Gandham, Computer Science, Academic

Programs, South Seattle College

Mentor: Emilia Gan, Pathobiology

A public charter school is a publicly funded school that is governed by a group or organization under charter law with the state. The charter school can have its own rules and regulations, but it must meet the accountability standards stated in its charter. In 2012, voters in Washington State approved Initiative 1240, allowing up to 40 charter schools to open in the state over the next five years. Our project will look at data from charter schools throughout the nation to answer the following questions about the charter schools that have recently opened and that will open in the near future in Washington State: Do the demographics of students attending charter schools differ from those of other public school students? Do students attending charter schools perform better from than other public school students as measured by graduation rates and/or test scores? We are collecting publically available data from state Department of Education websites and other sources. The data are being merged and cleaned using R, in preparation for statistical analysis and visualization using R. We intend to create a web application that will present our results and allow users to compare charter school performance to areas with similar demographics.

POSTER SESSION 2

Balcony, Easel 89

1:00 PM to 2:30 PM

The Effect of IAA28 Mutations on Arabidopsis thaliana Root and Aerial Phenotypes

Maia Sebek, Senior, Biology (Molecular, Cellular & Developmental)

Mary Gates Scholar

Mentor: Jennifer Nemhauser, Biology

Mentor: Britney Moss, Biology

Plants are constantly gathering and responding to information about their environment: sunlight, temperature, nutri-

ents, water levels, and neighboring plants. These various environmental cues are sensed by different parts of the plant which then must communicate with one another to shape the plant's growth and development over time. This coordination is often mediated by hormones that can be transported from one part of the plant to another. The plant hormone auxin controls this coordination by regulating the expression of specific auxin response genes through a multi-protein complex. In the absence of auxin, repressor proteins inhibit expression of auxin-response genes. In the presence of auxin, these repressors interact with the auxin receptor via specific conserved domains and are marked for degradation, allowing the downstream genes to be expressed. The model organism *Arabidopsis thaliana* has 29 different repressor proteins. Recent studies from our lab indicate that degradation rates within the auxin repressor vary widely and that newly-identified sequences in the repressors, called "rate motifs," contribute to precisely tuning the repressor degradation rate. We have hypothesized that altering the rate motifs of auxin repressors in plants will result in changes to the timing of developmental events. We are currently testing this hypothesis by looking at how both root and shoot development are impacted upon altering the rate motifs of one particular auxin repressor, IAA28. This experiment will help us understand how auxin repressor degradation controls the timing of plant development.

POSTER SESSION 2

MGH 241, Easel 148

1:00 PM to 2:30 PM

Nanotheranostic Particles for Traumatic Brain Injury

Julia Xu, Senior, Materials Science & Engineering

Mentor: Forrest Kievit, Neurological Surgery

Mentor: Pierre Mourad, Neurological Surgery

Mentor: Martin Suarez, Neurological Surgery

Traumatic brain injury (TBI) incurred from combat or settings such as sports injury is a serious trauma that can severely hamper a person's quality of life. The long term goal of this project is to develop a deployable on-site diagnostic and therapeutic tool that can quickly diagnose and reduce brain damage in time-critical emergency settings. The diagnostic source of this tool is tissue pulsatility imaging (TPI), an ultrasound technique that analyzes changes in blood flow in the brain. The therapeutic source comes from antioxidant nanoparticles (NPs) known to sequester oxygen radicals. In the early stages of TBI, there is an increased production of reactive oxygen species (ROS) that cause continual damage to the brain. Injection of these NPs could help sequester these ROS and reduce the long-term damage incurred after injury. We have tested a theranostic NP – able to act as both a diagnostic and therapeutic tool - that has been shown to sequester ROS in *in vitro* settings using a DCFH oxidation assay. Pre-

liminary data shows that NPs have reduced H₂O₂ levels by ~5-fold. We are continuing to develop NPs that can normalize elevated levels of ROS in the brain after TBI. These NPs are expected to provide imaging capabilities via magnetic resonance imaging to monitor and diagnose the severity of TBI as well as act as an ROS sponge to improve recovery from TBI. We have shown TPI is sensitive to TBI detection in animal models and TPI will be tested in this study as a potential on-site diagnostic tool for injury. After TBI, TPI indicates that tissue pulsatility metrics from brain tend to be larger in sham animals as compared to TBI animals. TPI will be used to monitor the severity and recovery of animal models over time to observe the effects of the NPs.

POSTER SESSION 2

MGH 241, Easel 152

1:00 PM to 2:30 PM

3D Printing Non-Solid Materials: From Chocolate to Neurons

Luke Johnson, Junior, Mechanical Engineering (Bothell)

William (Alex) Anderson, Sophomore, Pre-Major, UW

Bothell

Chele (Bruno) Ouattara, Junior, Mechanical Engineering (Bothell)

Mentor: Pierre Mourad, Neurological Surgery

Mentor: Ivan Owen, STEM, University of Washington - Bothell

Traditional 3D printers melt down an initially solid plastic filament, reshape the plastic in its near-liquid state, and then allow the plastic to harden again. However, these common printers only allow for the printing of a solid material that can be heated to a liquid state without any chemical degradation of the material, and do not address the printing of materials that are viscous liquids or pastes at room temperature and atmospheric pressure. Here we will report our initial contributions to this active field of inquiry, focusing on 3D printing high quality, customizable chocolate, as a preamble to printing 3D patterns of neurons in alginate. While chocolate is a solid at standard temperature and pressure, it will liquefy at 88 degrees F. We are designing a paste extruder with a novel means of deploying the chocolate. Specifically, our method of extrusion uses an evenly heated, FDA-compliant, aluminum syringe to liquefy chocolate and push it onto the print bed. A motor will control movement of the plunger and thus chocolate flow. After the chocolate printer is completed and functioning up to our standards, we will use our experience with paste extrusion to design and fabricate a bio-printer, which will use a print material with properties more akin to melted chocolate than solid plastic. As such, this bio-printer will contribute to the work of our colleagues at the Alliance for Design Innovation Lab located on the UW Bothell campus. The lab targets development of affordable, 3D-printed

prosthetics.

SESSION 2A

ECONOMICS: FROM ECONOMETRIC TECHNIQUES TO ECONOMIC THOUGHT

Session Moderator: Michelle Turnovsky, Economics
082A MGH

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Detecting Structural Breaks in Finance with Neural Networks

*Bryant Wong, Senior, Economics, Statistics, Mathematics
(Comprehensive)*

UW Honors Program

*Mentor: Gregory Duncan, Economics/Global Inventory
P&M*

When looking at financial data, we oftentimes wish to find some model which can approximate the underlying processes that generated that data. However, it can be the case that such a model is in fact flawed because of a structural break, which is essentially an unexpected shift in a time series model. Detecting structural breaks is of importance primarily because a statistically significant shift in the model will cause not only the predictive power of the model to be lost, but also make economic conclusions drawn from the model incorrect. In this presentation, we consider the feasibility of applying neural networks, a commonly used machine learning model, to solve this problem.

SESSION 2H

VIROLOGY

Session Moderator: Jason Smith, Microbiology
251 MGH

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

In Vitro Characterization of a Nanocomposite Drug Delivery System for Female-Initiated HIV Prevention

Christina Nhan, Junior, Bioengineering

NASA Space Grant Scholar

Mentor: Kim Woodrow, Bioengineering

Mentor: Emily Krogstad, Bioengineering

Many biological, social, and economic factors increase women's risk of contracting HIV. However, few options are available for them to protect themselves against infec-

tion. To address this problem, we are designing a female-initiated HIV prevention technology using nanocomposites made of nanofibers and drug-loaded nanoparticles. We designed nanofibers to release nanoparticles, which can penetrate the mucus layer to deliver antiviral drugs intracellularly. To better understand how nanocomposites behave during dissolution, experiments were conducted to characterize the *in vitro* behavior of two nanofiber polymer candidates, polyvinyl alcohol (PVA) and polyvinyl pyrrolidone (PVP). These characterizations would inform which polymer is best suited to the conditions of vaginal drug delivery and nanoparticle loading and release. A three-day release study was performed in sink conditions to analyze the release patterns of nanoparticles from PVA fibers versus PVP fibers. Fluorescence readings and calculations showed a burst release of nanoparticles: in 30 minutes, 84% of total nanoparticle content was released from PVA, while 83% was released from PVP. Additionally, nanofiber dissolution was analyzed using agar hydrogel plates to mimic the low volume conditions in the vaginal environment. The entire PVP sample wetted out within five seconds after coming into contact with the agar, indicating that diffusion may be the mechanism of nanoparticle release from PVP. In contrast, PVA shrunk as it wetted out over the course of 60 seconds. The PVA polymer compacted in the center as it shrunk; after a minute, the area of the sample had reduced in size by 70%, suggesting that nanoparticles may be getting mechanically squeezed out. In conclusion, PVA and PVP are both able to rapidly release nanoparticles upon dissolution, although their mechanisms of nanoparticle release may differ. Ongoing research includes loading an antiviral drug into nanoparticles and conducting biodistribution studies in mice of vaginally administered nanocomposites.

SESSION 2I

DIAGNOSTICS & DRUG DELIVERY

Session Moderator: Josh Bishop, Bioengineering
254 MGH

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Acoustic Caliper Design for Ultrasonic Attenuation Measurements in Tissue Phantoms

Ameen Tabatabai, Senior, Bioengineering

Mary Gates Scholar

Mentor: Wayne Kreider, Applied Physics Laboratory

Mentor: Yak-Nam Wang, APL

Mentor: Lawrence Crum

Mentor: Michael Bailey, APL

In liver transplantation, high overall fat content in donor livers contributes to poor graft function and lower patient outcomes. Currently, the surgeon's impression is the main method for

evaluating donor livers for fat. Since this is highly subjective, our lab is exploring a more objective method using ultrasound, specifically by measuring acoustic attenuation, which has previously been linked to fat content. This research project is focused on evaluating different output configurations of an acoustic caliper device to determine the optimal settings for measuring acoustic attenuation. The device includes transmit and receive transducers on opposite ends of a caliper and a gauge for measuring the distance between the transducer heads. Using LabVIEW, different waveform pulses can be applied at different frequencies from the transmit transducer through a sample. The transmitted signal is collected by the receive transducer at the other end of the sample. Acoustic attenuation is then estimated as the amount of signal loss in a sample relative to a reference measurement in water, which has negligible attenuation. Signal processing calculations were performed in MATLAB. This study evaluated the performance of two waveform types (chirped pulses and sinusoidal pulses) for measuring attenuation from 0.5 – 5 MHz in samples with thicknesses ranging from 15 – 50 mm. Measurements were performed in both a homogenous attenuation phantom and an inhomogeneous phantom that more closely mimics real tissue. For each phantom, waveform type, and measurement distance, attenuation measurements were repeated five times and the resulting data were analyzed statistically. Ongoing efforts with data collection and analysis will provide a basis for determining the most useful acoustic outputs for making accurate and repeatable attenuation measurements of tissue samples under ex vivo and in vivo conditions.

SESSION 2J

THE CHANGING OCEAN

Session Moderator: Virginia Armbrust, Oceanography
271 MGH

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Investigating Cyclic AMP as a Mediator of CO₂-Sensing in the Diatom *Thalassiosira pseudonana*

Ryan Groussman, Senior, Biology (Molecular, Cellular & Developmental)

Levinson Emerging Scholar, Mary Gates Scholar, UW Honors Program

Mentor: Virginia Armbrust, Oceanography

Mentor: Gwenn Hennon, Oceanography

Since the Industrial Revolution, CO₂ concentrations have risen from 280 to 400ppm, and are expected to double by the century's end. Approximately half of CO₂ emissions are absorbed into the oceans, where 50 Pg C/year are taken up by marine phytoplankton. The most productive group of phy-

toplankton are the diatoms, accounting for ~40% of marine primary production. The response of diatoms to increasing CO₂ is an important element in considering biogeochemical cycling of carbon. Recent full transcriptome analysis of the model diatom *Thalassiosira pseudonana* grown under elevated CO₂ identified several genes whose transcript abundance is significantly reduced under increased extracellular CO₂ concentrations. Included in this set of genes is a carbonic anhydrase gene, *delta-CA3*, which is thought to encode a component of the carbon concentrating mechanism. Research on a distantly related diatom, *Phaeodactylum tri-cornutum*, suggests that CO₂-sensing is moderated by the secondary messenger cyclic AMP (cAMP). We hypothesize that cAMP is also a key intermediate messenger in the regulation of CO₂-responsive genes in *T. pseudonana*. To test this, we grew *T. pseudonana* in semi-continuous triplicate cultures under two CO₂ concentrations, approximating current ambient partial pressures of near 400ppm, and a high CO₂ treatment of near 1000ppm. Each culture was sampled with or without exposure to IBMX, a compound that inhibits the phosphodiesterase-mediated breakdown of cAMP. Treatment with IBMX raises intracellular cAMP concentrations. Next, we will measure differential transcription of targeted CO₂-correlated genes using qRT-PCR. We anticipate that increased concentrations of cAMP in either the elevated CO₂ treatment or the presence of IBMX will result in a reduced abundance of cAMP-regulated transcripts compared to the abundance of control transcripts. The results of this research will be important in clarifying the role of cAMP as it pertains to CO₂-sensing in diatoms, allowing inference of diatom responses to changing ocean environments.

SESSION 2K

BIOMATERIALS AND BIOTECHNOLOGY

Session Moderator: Qingxin Mu, Materials Science and Engineering

284 MGH

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

NAIL: Nucleic Acid Detection Using Isotachophoresis and Loop-Mediated Isothermal Amplification

Kevin Kimura, Senior, Chemical Engr: Nanosci & Molecular Engr

Mentor: Jonathan Posner, Mechanical Engineering

Mentor: Mark Borysiak, Chemical Engineering

The recent Ebola outbreak has demonstrated the need for rapid and accurate diagnostics tests for infectious diseases to improve global health. Nucleic acid amplification tests are the gold standard for many infectious disease di-

agnoses due to high sensitivity and specificity, rapid operation, and low limits of detection. Despite the advantages of nucleic acid amplification tests, they currently offer limited point-of-care (POC) utility due to the need for sophisticated instruments and laborious sample preparation. We have developed a point-of-care Nucleic Acid Isotachophoresis LAMP (NAIL) diagnostic device. NAIL uses isotachophoresis (ITP) and loop-mediated isothermal amplification (LAMP) to extract and amplify nucleic acids from complex matrices for point-of-care applications. ITP is an electrokinetic separation technique that uses an electric field and two buffers to extract and purify nucleic acids in a single step with minimal sample preparation. LAMP amplifies nucleic acids at constant temperature and produces large amounts of DNA that can be detected using a mobile phone camera. The device requires minimal user intervention because capillary valves and heated air chambers act as passive valves and pumps for automated fluid actuation. NAIL has been shown to extract and detect pathogenic *E. coli* O157:H7 cells from whole milk samples. The NAIL device has a limit of detection of 1,000 CFU/mL for *E. coli* cells artificially inoculated into whole milk, which is two orders of magnitude improvement to standard in-tube LAMP reactions with diluted milk samples and comparable to lab-based PCR systems. The NAIL device potentially offers significant reductions in the complexity and cost of traditional nucleic acid diagnostics for point-of-care applications.

SESSION 20

GENETICS & MICROBIOLOGY

Session Moderator: Wendy Thomas, Bioengineering
389 MGH

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Investigating the Accumulation of Single-Stranded DNA in a Ligase Mutant

Maria Naushab, Senior, Biology (Physiology)
Mentor: M.K. Raghuraman, Genome Sciences
Mentor: Bonita Brewer, Genome Sciences

During DNA replication, the ligase enzyme plays a pivotal role in the synthesis of the lagging strand by joining together short segments of DNA called Okazaki fragments. In the budding yeast *Saccharomyces cerevisiae*, it has been observed that extrachromosomal single-stranded DNA (ssDNA) is produced during replication if the ligase is inactive. Our working model is that this ssDNA is generated by the displacement of existing Okazaki fragments by newly synthesized ones. Using a temperature-sensitive *S. cerevisiae* strain with a ligase mutation (*cdc9-1^{ts}*), I am investigating the effect of this accumulation of ssDNA on the viability of cells. I evaluate vi-

ability based on the ability of a cell to recover and form a colony after a brief period of ligase inactivation. I have found that *cdc9-1^{ts}* cells have significantly reduced viability when grown at the permissive temperature after undergoing replication at the restrictive temperature. This result indicates that the ssDNA generated during replication due to the dysfunction of the ligase enzyme has a definite negative impact on the health of the cells. I am also interested in possible relationships between the ligase and other genes that may explain why this ssDNA arises. To find such a relationship, I am transforming the *cdc9-1^{ts}* strain with a genomic library and evaluating viability of the transformants at the restrictive temperature to see if there is any gene that helps cells overcome the negative effects of the ssDNA. Because ssDNA has been implicated in a number of autoimmune disorders, understanding exactly how ssDNA is generated within cells could be a key step in developing treatments for such disorders.

SESSION 2Q

SUB-ATOMIC PARTICLES, ROCKETS AND PLASMAS

Session Moderator: Robert Winglee, Earth And Space Sciences

026 JHN

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Disrupting Rocket Science: 3D Printing for High Altitude Rockets and Instrumentation

Erin McLean, Senior, Human Centered Design & Engineering

NASA Space Grant Scholar

Mark Starnes, Senior, Human Ctr Des & Engr: Human-Computer Int

David Foulds, Senior, Mechanical Engineering: Mechatronics

Nathan Briley, Non-Matriculated,

Michelle Vega, Senior, Electrical Engineering

Mentor: Robert Winglee, Earth And Space Sciences

Mentor: Chad Truitt, Earth and Space Sciences

Traditional manufacturing processes for high altitude rockets are time consuming and vulnerable to a high degree of human error. Currently, in Professor Robert Winglee's Rockets and Instrumentations lab, a rocket and its scientific payload can be built in ten weeks but without a guarantee that the system will have a successful flight. Additive manufacturing is the process of joining materials to create a 3D model (i.e. 3D Printing). With the rise of 3D printing in the public conscience, and the variety of new printer filaments coming on to market, incorporating additive manufacturing processes into our build cycles could benefit high altitude rock-

etry research. With 3D printing, we are able to build multiple rocket frames and internal components in a fraction of the time as traditional processes and with fewer labor hours. For this research project, we tested the viability of Polyactic Acid (PLA) filament printed rocket airframes for transonic flights. We used Kilo print, a large format 3D printer built by the WOof 3D printing club on the University of Washington campus. The airframe has embedded sensors to record data on stress, strain, flex, and temperature. This data, combined with a flight post-mortem has helped us determine if PLA printed rocket components are viable for future flights. The rocket, nicknamed Ctrl+P, was launched in late April from the Black Rock Desert in Nevada.

SESSION 2Q

SUB-ATOMIC PARTICLES, ROCKETS AND PLASMAS

*Session Moderator: Robert Winglee, Earth And Space
Sciences*

026 JHN

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

The Search for Hidden Valley Particles

Andrew Arbogast, Senior, Physics: Biophysics
Jiasheng (Stanley) Xie, Senior, Physics: Applied Physics
*William Li, Senior, Physics: Comprehensive Physics,
Computer Science*
Mentor: Gordon Watts, Physics

The Hidden Valley is a new theory that extends the Standard Model, our current best description of particles and forces that make up our universe. The Hidden Valley theory, along with others, extends the Standard Model in an attempt describe phenomena like dark matter not yet included in the Standard Model. Hidden Valley particles do not interact with Standard Model particles, and are therefore impossible to directly detect. But by using their predicted decay products, we may be able to prove their existence. We are currently running simulations to try to give us an idea of what we should be looking for when we use data from the Large Haddon Collider at CERN. Features of the model and the search strategy will be presented.

SESSION 2R

ISSUES AND IDEAS ABOUT HEALTH AND PUBLIC HEALTH IN THE PACIFIC NORTHWEST: PAST TO PRESENT

*Session Moderator: Jack Berryman, Bioethics and
Humanities*

111 JHN

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Society and Biology: Understanding the Relationship between Race, Socioeconomic Status, and Disease through Lung Cancer Incidence among Smokers

Jutarat (Jan) Likit, Junior, Psychology, Philosophy
*Jennifer Look, Senior, Biology (General), Comparative
History of Ideas*
Mentor: Phillip Thurtle, Comparative History of Ideas
Mentor: Ann Voorhies, Psychology

The onset of disease can be brought about as a result of both environmental as well as genetic factors. Recently, other factors have also been given increased attention such as the classification of racial groups, with respect to gender and class, and their influence on human physiology and wellness. This project seeks to examine the relationship between socioeconomic and racial factors with respect to rates of lung cancer as a result of smoking. We argue that social and political constructions of group identities affect survival at the level of the individual by influencing their propensities for contracting stress-related diseases and illnesses, in this case lung cancer. By using a biological and critical theoretical framework as the foundation of our analysis, we have challenged the current ideas of illness by suggesting that social and cultural influences at the time of and after birth play a great role in determining a person's disposition for health or sickness. Our paper utilizes arguments presented by Michel Foucault's "Society Must be Defended" and George Lipsitz's "The Possessive Investment in Whiteness" to support our claims. Additionally, using a keyword search on various journal databases, we reviewed a number of other literature that provided evidence of structural inequalities which highlight the relationship between social identities and quality of health. This paper raises awareness of the need for scholarship on the impacts of societal effects during the early years and how interventions at this time might decrease the disproportionate rates of disease in marginalized and underrepresented groups.

POSTER SESSION 3

Commons East, Easel 81

2:30 PM to 4:00 PM

The Effects of Therapeutic Intraspinal Microstimulation and Chondroitinase ABC on Muscle Fiber Type Transition Following Spinal Cord Injury ??

Ryan Carlson, Senior, Neurobiology, Biochemistry

Mary Gates Scholar, UW Honors Program

Mentor: Chet Moritz, Physiology & Biophysics

Spinal cord injuries (SCI) are a devastating condition, and incomplete injuries of the cervical spinal cord are the most common among patients. In incomplete injuries, recovery of function can be partially regained through sprouting and/or rewiring of spared neural tissue. Our group has created a more permissive environment for these effects through the use of Chondroitinase ABC (ChABC), which enzymatically removes inhibitory Chondroitin Sulfate Proteoglycans (CSPGs) from the lesion site, as well as perineuronal nets. We paired ChABC injections with therapeutic open-loop intraspinal microstimulation (ISMS) in order to further promote plasticity. While previous studies have shown that each of these strategies can help promote recovery of function alone, our preliminary data suggests that much greater effects are seen when they are combined. A major symptom of SCIs is muscle weakness and fatigue. This is caused, in part, by wide-scale transitions of muscle fiber types from slow (Myosin type I) to fast-twitch (Type IIa, IIb, IIc/x) following loss of motor neuron input. After treatment with ChABC and therapeutic ISMS, we completed an immunohistochemical analysis to characterize their effects on slowing this transition of fiber type in the triceps muscles of rats with incomplete unilateral spinal contusion injuries (n=7). After isolating specific myosin isoforms, we quantified the number of each muscle fiber type in each triceps, as well as characteristics of the fibers themselves, such as cross sectional area. We hope that these results will lead to a new understanding of injury-related fiber type changes and strategies to combat them after central nervous system damage.

POSTER SESSION 3

MGH 241, Easel 156

2:30 PM to 4:00 PM

Fabrication and Testing of 3D-Printed Wrist-Driven Orthoses for Individuals with Spinal Cord Injury

Alexandra Portnova, Senior, Mechanical Engineering

Mary Gates Scholar

Mentor: Katherine Steele, Mechanical Engineering

Affordable 3D-printers have created a new toolset that may help improve the fabrication and function of a variety of commercially available orthoses that are designed to help improve movement for individuals with disabilities. The purpose of this study is to improve the design of wrist-driven orthoses (WDO) by reducing their complexity and fabrication time and increasing their availability through the use of 3D-printing

technology and open-source designs. WDOs are prescribed for patients with incomplete spinal cord injury (SCI) at the 6th cervical (C-6) level who exhibit strong muscle activity in the wrist extensor muscles and little to no mobility in the fingers. By utilizing wrist motion, the device assists in opening and closing the hand and imitates a grasp-and-release motion, which consequently enhances performance of tasks of daily living. The study consists of two phases, which are still in progress. The focus of the first phase is to evaluate the potential of 3D-printing technology for orthotic fabrication from the perspective of practitioners and students who currently fabricate orthoses, including orthotists, therapists, and physicians. Feedback from practitioners will be used to further improve design and fabrication methods. The second phase focuses on evaluating the device from the perspective of end users. The specific aims of this phase are to receive feedback from end users and test the effectiveness of the device in improving hand function by using a variety of functional tests, electromyography, and ultrasound.

POSTER SESSION 3

Commons West, Easel 42

2:30 PM to 4:00 PM

The Effects of Fear on Circadian Rhythms

Jeffrey Lee, Senior, Neurobiology, Philosophy

Mary Gates Scholar, UW Honors Program

Mentor: Horacio de la Iglesia, Biology

Circadian rhythms are daily oscillations in behavior and physiology that are fundamental to maintaining proper health. Research has shown that these endogenous circadian rhythms can be “entrained” by different cues, such as the light-dark cycle. However, it is unknown whether they can be entrained by fearful stimuli. In this project we test the hypothesis that cyclic fearful stimuli during the night, when nocturnal mice typically forage and feed, can act as an entraining signal to the circadian system. We use a mouse cage divided between a nesting area and a foraging area where the animal needs to retrieve its food from. Within this foraging area mice can receive footshocks, which act as aversive fearful stimuli. We are testing whether footshocks delivered during the nighttime are sufficient to induce mice to shift from their natural nocturnal pattern of foraging and feeding to a diurnal pattern in these behaviors. If feeding and foraging shift to the daytime, as it is the case for rats under similar conditions, we will also test whether this behavioral shift represents the output of a circadian clock entrained by cyclic fear by releasing the animals into constant environmental conditions. Our experiments in mice will open the gate to new experiments to unmask the genetic and neural pathways by which fear and anxiety may lead to changes in circadian activity patterns.

POSTER SESSION 3

Balcony, Easel 113

2:30 PM to 4:00 PM

Seattle Streetscapes: An Analysis of Urban Form in the City of Seattle through Sketching

Dat Nguyen, Senior, Community, Environment, & Planning
Mentor: *Dennis Ryan, Urban Design & Planning*

This project comprises of a series of sketches each detailing aspects of a specific streetscape in the many neighborhoods of Seattle. In examining the quality of streetscapes, different parts of neighborhoods and even whole neighborhoods in general can vary significantly due to differing needs addressed. For instance, a good streetscape for pedestrians cannot be replicated everywhere if the primary goal is to move as much traffic as possible in an industrial area. This project documents these contrasts in design philosophies expressed throughout the city. Also, major changes are happening in the city, primarily in those walkable places, whose ideals have again come into fashion. This project was conducted on foot, each sketch informed by a walking person's analysis. Drawing from the work of Victor Steinbrueck, who sketched parts of Seattle in seminal works both in 1962 and 1973, this project seeks to document this Seattle's time of change, consistency, improvement, and loss.

POSTER SESSION 3

Commons West, Easel 32

2:30 PM to 4:00 PM

Assessing Water Quality in the San Juan Islands, Washington Using Benthic foraminifera

Keelin Lacey, Senior, Earth and Space Sciences: Geology
Mentor: *Elizabeth Nesbitt, Earth And Space Sciences*
Mentor: *Ruth Martin, Burke Museum/Earth and Space Sciences*

The purpose of this study was to use foraminifera to assess the bottom water quality of the San Juan Islands. Foraminifera are microscopic shelled single-celled organisms that live in marine environments. The foraminifera used in this study are benthic and live within or on top of sediments. These organisms form shells of calcium carbonate (calcareous) or agglutinated sand grains, and different species assemblages can be used to determine water and sediment quality. The San Juan Islands have fewer pollution sources than other areas in the Puget Sound. However, the city of Victoria, British Columbia releases raw sewage into Northern Puget Sound, which could affect water quality in the islands. In this study, 26 species of foraminifera were recovered from 20 sediment samples collected by the Washington Department of Ecology in 2002, 2003, and 2012. In each sample, the density of indi-

viduals, species richness (number of species in each sample) and number of calcareous specimens showing signs of dissolution (from acidification) were determined. The species richness varied dramatically between samples. Some shallow embayments, including Prevost Harbor, Westcott Bay, and Reid Harbor, contained very few foraminifera. Conversely, several samples within Roche Harbor had a particularly high diversity with up to 19 different species. The samples within the shallow embayment of Roche Harbor contained a high number of partially dissolved calcareous individuals, especially in two species, *Elphidiella hannaia* (54% dissolved) and *Islandiella limbata* (up to 25% dissolved). The high species richness in Roche Harbor is an indication of better water quality, however the high number of dissolved individuals implies that the water has a low pH. Acidification may be caused by human recreation in Roche Harbor or by acidity coming from the Pacific Ocean.

POSTER SESSION 3

Commons East, Easel 58

2:30 PM to 4:00 PM

A High-Throughput, Phenotypic Screening Device to Characterize Breast Cancer Migration

Kevin Mun, Senior, Bioengineering
Mentor: *Mary Gates Scholar, UW Honors Program*
Mentor: *Deok-Ho Kim, Bioengineering*
Mentor: *Peter Kim, Bioengineering*

Over 90% of cancer-related deaths are caused by the migration of invasive cells along bundles of extracellular matrix (ECM) fibers. The ECM itself is an important part of a human cell and composed of many proteins, such as collagens and fibronectins. Two factors affect the migratory behaviors of cells: the stiffness of the ECM and the activity of the PI3K pathway. These two factors are essential in our quest to understand the process of cancer cell migration. First, as the stiffness of a cell's ECM increases, many biochemical changes take place, such as increased cell division and stronger anchorage to neighboring cells. Most importantly, cell migration is substantially increased. Second, the PI3K pathway plays a crucial role in cell migration. Two prominent cell lines in the pathway are the PTEN knockout and PIK3CA knockin breast epithelial cell lines, which are known to decrease and increase the activity of PI3K respectively. In order to explore these relationships we employed novel nanoengineered platforms with defined topographies and breast epithelial cells with or without a cancer-inducing mutation of the PI3K pathway. Ultraviolet light assisted capillary force lithography was used to fabricate nanoengineered cell culture platforms with arrays of grooves-ridges. Additionally, polydimethylsiloxane was used to vary the stiffness (100 kPa to 800 kPa) of these platforms. The migration velocities of each cell line on substrates of varying stiffnesses were quantified

with ImageJ and MATLAB. Results show that there is statistical significance between the migration velocities on patterned and unpatterned substrates of low stiffness (100 kPa), indicating that the stiffness of a cell's ECM does indeed play a role in cell migration.

POSTER SESSION 3

Commons East, Easel 53

2:30 PM to 4:00 PM

Prevalence of Self-Reported Xerostomia in Adolescents Hospitalized in an Inpatient Psychiatric Clinic

Manvir Kaur, Junior, Biology (General)

UW Honors Program

Mentor: Donald Chi, Oral Health Sciences

Xerostomia (dry mouth) is a condition that can lead to plaque accumulation, cavities, eating problems, and overall oral discomfort. Research over the years has shown that the prevalence of xerostomia is correlated with gender and age, however these studies have only been conducted on adult populations. Adolescents with psychiatric conditions take medications that might predispose them to xerostomia. In this pilot study, we estimated the prevalence of xerostomia from a convenience sample of adolescents hospitalized in an inpatient psychiatric clinic (N=25) and examined whether: 1) gender and age were associated with xerostomia; and 2) if xerostomia was associated with self-reported dental caries (ever having had a cavity). Adolescents were asked to complete the Xerostomia Index to assess self-reported xerostomia (no/yes). Participants were between the age of 9 and 14, of whom 72% were male and 28% female. 60% of those studied reported having xerostomia. My findings show that there is no statistically significant relationship between xerostomia prevalence and the subject's gender ($P=.99$), age ($P=.659$), and self-reported ever having had a cavity ($P=.26$). Thus, gender and age are not associated with xerostomia prevalence and adolescents with xerostomia did not appear to have higher rates of dental caries. Other factors may be associated with xerostomia in adolescent populations. Future research focusing on xerostomia in adolescents should be conducted.

POSTER SESSION 3

Commons East, Easel 74

2:30 PM to 4:00 PM

Prednisone Pharmacokinetics during Pregnancy and Lactation

Brooke Bennett, Senior, Biochemistry

Mentor: Mary Hebert

Mentor: Rachel Ryu, Pharmacy

Prednisone is a medication that reduces inflammation and in-

hibits activity of the immune system. Many conditions can warrant its use in pregnant and lactating women, so understanding the pharmacokinetics of prednisone, how the body handles the drug, during pregnancy and lactation is important for choosing the best dose. Therefore, the objective of this study was to evaluate the pharmacokinetics of prednisone and its active metabolite, prednisolone, in pregnant and lactating women. Nineteen women received oral doses of prednisone ranging from 2 to 40 mg per day in early- ($n=3$), mid- ($n=9$), and late-pregnancy ($n=13$), as well as postpartum with ($n=2$) and without ($n=5$) lactation. Blood and urine samples were collected over one dosing interval from all participants, and breast milk was collected from those who were lactating. Concentrations of prednisone and prednisolone were used to calculate pharmacokinetic parameters. The apparent oral clearance, the rate the body clears oral drug, of both prednisone and prednisolone significantly increased between the 5 and 20 mg doses. Higher concentrations of prednisone and prednisolone resulted in higher percent unbound in plasma. These data are consistent with dose- and concentration-dependent pharmacokinetics of prednisone and prednisolone due to concentration-dependent plasma protein binding. Unbound prednisolone's terminal half-life, the time it takes to clear half of the drug, was prolonged in pregnancy compared to postpartum. Other parameters were unchanged, however, suggesting that dose adjustments may not be necessary during pregnancy. The ratio of breast milk to plasma drug exposure ranged from 0.49 to 0.57 for prednisone and 0.019 to 0.030 for prednisolone. Infant exposure to prednisone and prednisolone was 0.35 to 0.53% and 0.09 to 0.18% of the mother's weight-adjusted dose, respectively. This suggests that oral prednisone administration is compatible with breastfeeding.

POSTER SESSION 4

MGH 241, Easel 139

4:00 PM to 6:00 PM

Fouling Resistant Zwitterionic Polymer Coatings for Reverse Osmosis Desalination Membranes ??

John Cisney, Senior, Chemical Engr: Nanosci & Molecular Engr

Mary Gates Scholar, Washington Research Foundation Fellow

Mentor: Shaoyi Jiang, Chemical Engineering

The planet is experiencing dramatic climate shifts resulting in large regions enduring significant weather events of unprecedented proportions. Drought is a weather phenomenon that can cause devastating economic and agricultural impacts that many of these regions are unequipped to deal with. According to the population reference bureau (PRB), approximately half of the world's population resides within 200 kilometers of a coastline. Thus, resorting to large bodies of water

for clean drinking water is an obvious solution to unexpected drought. Zwitterions are environmentally friendly molecules that maintain a positive and negative charge simultaneously. Research has shown that this class of molecules possess non-fouling capabilities in a variety of marine applications due to their hydrophilic properties. Therefore, using zwitterionic polymer coatings in an effort to eliminate the membrane fouling issue that plagues reverse osmosis (RO) desalination plants is promising. Currently, the water is pretreated with harmful chemicals to reduce membrane fouling. Membrane fouling has prevented RO desalination from emerging as a viable source of fresh water due to the high maintenance and operation costs associated with this method. In the Jiang lab, I have synthesized zwitterionic polymers, poly(sulfobetaine methacrylate) (pSBMA) and poly(carboxybetaine methacrylate) (pCBMA), that have been grafted to the surface of RO membranes of varying compositions. The coated membranes were then exposed to solutions containing fluorescently tagged proteins. The non-fouling performance of the coated membranes was then compared to uncoated membranes by measuring the fluorescence intensity of the bound surface proteins. Additionally, enzyme-linked immunosorbent assays (ELISA) were used to quantify the surface protein density. Utilizing zwitterionic coatings to eliminate the fouling issues experienced by desalination plants will reduce the monetary and environmental costs of RO desalination. This action will further prevent harmful pretreatment chemicals from entering the environment.

POSTER SESSION 4

Commons West, Easel 23

4:00 PM to 6:00 PM

Sodium-Dependent Phosphate Cotransporter PiT-1 and Vascular Calcification: Role of PiT-1's Intracellular Domain in Uptake-Independent Signaling

Kadin Brooks, Senior, Bioengineering

Amgen Scholar, Mary Gates Scholar, UW Honors Program

Mentor: Cecilia Giachelli, Bioengineering

Vascular calcification greatly increases risk of cardiovascular disease, the leading cause of death in patients with diabetes and chronic kidney disease, by decreasing the compliance of major arteries. Vascular calcification is an active process attributed to vascular smooth muscle cell (VSMC) mineralization. The type III sodium-dependent phosphate cotransporter, PiT-1, regulates osteochondrogenic conversion of VSMCs under elevated extracellular phosphate conditions. Studies in our lab found that VSMCs respond to elevated phosphate through PiT-1 with a cell signaling mechanism independent of phosphate uptake. However, the signaling pathway by which PiT-1 induces osteogenic gene expression in VSMCs is poorly understood. I hypothesize that the intracel-

lular domain of PiT-1 is required to bind adaptor proteins in response to elevated phosphate, triggering a phosphorylation cascade that promotes osteochondrogenic differentiation. In this study, VSMCs were engineered to overexpress the intracellular domain of PiT-1 in the cytosol to test the hypothesis that this domain would bind to adaptor proteins and inhibit VSMC calcification. Primary murine aortic VSMCs were transduced with the PiT-1 intracellular domain by retroviral infection. RNA overexpression of the intracellular domain was confirmed by reverse transcriptase PCR. However, expression of the protein measured by Western Blot was much lower than expected. The VSMC strains were induced to calcify at 3.0 mM extracellular phosphate. VSMC strains had significant induction of calcification at 3.0 mM elevated phosphate (VC = 90.09 ± 9.29 , inPiT-1 = 71.89 ± 11.97 ug Calcium/mg Protein) compared to 1.0 mM phosphate, but calcification was not significantly different between VSMC strains. These results suggest that the amount of expression of the intracellular domain construct in the engineered VSMCs was not large enough to determine the effect of this protein on vascular calcification.

POSTER SESSION 4

MGH 241, Easel 141

4:00 PM to 6:00 PM

Effect of Ionic Liquid Solutions on Protein-Catalyzed Processes

Kovas Palunas, Senior, Chemical Engr: Nanosci & Molecular Engr

*Mary Gates Scholar, UW Honors Program
Mentor: Jim Pfaendtner, Chemical Engineering*

Ionic liquids are chemicals that are both liquid at room temperature and contain atoms with formal charges. These two properties make ionic liquids excellent solvents; not only can they dissolve both polar and non-polar compounds, but their effect can also be easily turned by mixing them with water. This makes ionic liquid solutions very good at facilitating many nanoscale processes, namely protein-catalyzed ones. Since proteins normally can only perform their usual function in a water based environment similar to that found in living cells, the discovery of a new medium in which these proteins can function has a myriad of interesting nanofabrication applications. To study the viability of ionic liquid solutions as protein solvents, several computer simulations have been done on the short model peptides LK-alpha-14 and LK-beta-15. These peptides were exposed *in silico* to both pure water and ionic liquid solution while at an air-solution interface, and simulated for 50 ns. Preliminary results show that the peptides keep their secondary structure, which makes them highly likely to retain their function. This is promising, as it shows that ionic liquid solutions can successfully solvate these proteins without denaturing them, unlike many other

less polar solvents that have been tried. With this information, future simulations can now be done that will hopefully show actual processes working with important protein catalysts, such as enzymes.

POSTER SESSION 4

MGH 241, Easel 140

4:00 PM to 6:00 PM

Stereolithographic Processes for Biocompatible Hydrogel Formation

Daniel Leon, Senior, Chemical Engineering

Mary Gates Scholar, NASA Space Grant Scholar

Mentor: Shaoyi Jiang, Chemical Engineering

Major challenges in tissue engineering come from difficulties inherent to the process of generating suitable biocompatible scaffolds that are needed to promote desired cell formation and growth. Several of these difficulties in controlling the spatial, temporal, mechanical and biochemical architectures could be overcome by taking advantage of the recent developments that make high-resolution stereolithography (3D printing) technology fast and affordable. This project focuses on the development of protocol for the formation of photo-induced carboxybetaine acrylamide (CBAA) hydrogels using an extrusion-based 3D printer for rapid prototyping of biocompatible tissue scaffolds. CBAA hydrogel formation using photolithography was investigated by considering multiple aspects relevant to their formation. Multiple photocatalysts and crosslinking agents were considered for the strength and localization of activity. The effects of extrusion rate and ultraviolet wavelength intensity were also considered. Then the temporal viability of cells on these hydrogel environments was evaluated. A key challenge affecting hydrogel formation persists in the solvation of the photocatalyst into the aqueous CBAA monomer solution. Further, specificity of reaction at the desired location remains a challenge. That being the case, the ability of cellular proliferation to occur shows potential for improvement. Results indicate that photolithographic techniques used for the rapid prototyping of biocompatible CBAA hydrogels has the potential to address many of the difficulties encountered in the field of tissue engineering. Further investigation into alternative photocatalysts and using a higher resolution 3D printer may prolong cell viability.

POSTER SESSION 4

MGH 241, Easel 166

4:00 PM to 6:00 PM

Modified Slow Off-Rate Aptamers with Zirconium-89-Label for PET Imaging

Bradley Neel, Senior, Biochemistry

NASA Space Grant Scholar

Mentor: Donna Cross, Radiology

The goal of this research is to test and develop an aptamer labeled with zirconium-89 to target an Epidermal Growth Factor Receptor (EGFR) to allow *in vivo* PET imaging. Aptamers are novel binding reagents that are comprised of short strands of DNA or RNA. The aptamers we are using are DNA-based with synthetic side chains that afford optimal binding properties, as well as improved pharmacokinetics compared to RNA constructs. Our target, the EGFR, is overexpressed by many human cancers, including lung carcinomas, breast cancers, and gliomas, and is a prime target for developing novel targeting reagents to treat these tumors with more specificity. We have demonstrated specific EGFR binding *in vitro* through fluorescence microscopy with a fluorescently labeled version of our aptamer that bound significantly greater to EGFR positive cell lines than negative cell lines. We also performed a flow cytometry experiment where an EGFR positive cell line (U118) showed more than 1 log increase on the phycoerythrin spectrum scale when bound, compared to an unbound sample. We have been able to conclude that our aptamer is indeed selective, and preliminary experiments indicate that this selectivity remains when the aptamer is labeled with zirconium-89. In the future, we will attempt to reduce nonspecific binding in both fluorescent and radioactive binding assays by refining the aptamers synthesis and purification strategies. We will also begin testing the optimal aptamer constructs in our *in vivo* xenograft models. These xenograft experiments will include growing cancer cell lines in culture, injecting these cells into nude immunodeficient mice to grow the xenograft tumors, followed by tumor imaging with the Zr-labeled aptamer.

POSTER SESSION 4

Commons West, Easel 11

4:00 PM to 6:00 PM

Identifying Pathogenic Copy Number Variants in Patients with Epileptic Encephalopathies

John Nguyen, Senior, Neurobiology

Mentor: Heather Mefford, Pediatrics

Mentor: Gemma Carvill, Pediatrics

Mentor: Amy LaCroix

Epileptic encephalopathies (EE) are severe forms of epilepsies where recurrent seizures contribute to significant neurocognitive impairment and developmental delay for children with this disorder. Recent studies have shown that some cases of pediatric EE are caused by copy number variants (CNV), which are chromosomal deletions, duplications, or insertions of DNA across the genome. CNVs may contain specific

genes that are important for neural health, some of which can cause disease when there is a copy number change. Despite significant advances in epilepsy gene discovery, the majority of pediatric EE cases remain unresolved. I am investigating whether I can identify rare CNVs in EE patients where the genetic cause is not known. I will screen EE patients for CNVs using a technique called array comparative genomic hybridization (aCGH). This technique will identify specific loci where a pathogenic, or disease-causing, CNV may exist in a patient that is not found in the control genome. I anticipate that if a CNV is found in an EE patient, I will determine its pathogenicity by comparing the genotype and phenotype of the patient to parents tested by aCGH to determine if the CNV is *de novo* - arising for the first time in that individual and not inherited from either parent. We also expect that in families who have experienced seizures or have seizure disorders, patients may inherit rare mutations from either parent. Finding a genetic basis for epilepsy by identifying rare mutations will advance our understanding of the pathology of the disease. Furthermore, identification of particular pathogenic genes will be useful in the clinical setting for genetic counseling of affected patients and families.

POSTER SESSION 4

MGH 241, Easel 165

4:00 PM to 6:00 PM

Longitudinal Comparison of Repetitive Blast Exposure Mild Traumatic Brain Injury in Veterans Using FDG PET Imaging

Lisa Hysa, Senior, Biology (Physiology)

Mary Gates Scholar

Mentor: Donna Cross, Radiology

Mild traumatic brain injury (mTBI) caused by repetitive explosive exposure is a very common injury that Iraq veterans experience. Although it may not cause paralysis/death, it has devastating immediate effects on memory and concentration. We wished to investigate if individual subject hypometabolic regions are stable over time in longitudinal follow up imaging. We hypothesize that the downstream consequences of mTBI that may lead to neurodegenerative processes could be due to persistent regional hypometabolism. Positron emission tomography with [18F]-fluorodeoxyglucose (FDG-PET) imaging of cerebral glucose metabolism was used to assess brain metabolism in 13 veterans (mTBI) with mean age 31.7 ± 8.0 (range 24-49) years. Mean time between first scan and second scan was 3.73 ± 0.8 (range 2.2-4.7) years. We performed a longitudinal comparison with the follow up FDG-PET scans to determine if the hypometabolic differences altered as compared to FDG-PET from a group of age-matched community controls (n=9). Analysis included anatomic standardization through linear scaling/non-linear warping to the brain atlas followed by normalization to a mean whole brain

metabolism. We used an automated program to segment the brain into 19 independent anatomical regions. The results indicated that metabolism in 3 regions in mTBI subjects were more than 2 standard deviations below the mean of controls: (9/13 right frontal, 9/13 right medial frontal, and 6/13 left medial frontal and these regions then resolved to within the normal range by scan 2 in 8/9, 7/9 and 5/6 subjects (78-89%)). We also found one region, left frontal, that was hypometabolic in 3 subjects and became further decreased by scan 2 in 2/3 mTBI (67%). These results indicate that hypometabolic regions in veterans with multiple mTBI may be normalizing slowly over time. This could be in part due to compensatory mechanisms related to a functional metabolic reserve in the brains of these subjects.

POSTER SESSION 4

Commons West, Easel 32

4:00 PM to 6:00 PM

The Effect of Material on Salivary Biomarkers in Alzheimer's Disease

Joanna Liao, Senior, Biochemistry

Mary Gates Scholar, UW Honors Program

Mentor: Tessandra Stewart, Pathology

Mentor: Jing Zhang, Pathology

Mentor: Min Shi, Department of Pathology

Alzheimer's disease (AD) is an age-related neurodegenerative disorder afflicting millions of people worldwide. Biomarker research seeks to identify molecules to diagnose, track, and differentiate AD from similar diseases like Parkinson's disease (PD). For instance biomarker candidate alpha synuclein (α -syn) is higher in cerebrospinal fluid (CSF) from AD patients and lower in PD. However, CSF collection involves an invasive procedure, while blood, though less invasive to collect, is affected by peripheral systems. This has led researchers to consider a more accessible fluid, saliva, as a source for biomarkers. However decreased salivary production related to age, compounded by dry mouth in AD patients, can complicate collection of an adequate amount of saliva via passive donation. To facilitate collection, some studies have used materials such as cotton to stimulate saliva production; however, the materials used may affect native protein concentration. For instance α -syn is known to stick to cotton, artificially lowering the apparent concentration of this protein in samples collected using cotton stimulation. Thus a systematic examination of the effect of various materials on sample composition is needed to determine ideal conditions for stimulated saliva collection. In this study I sought to determine how common materials impact salivary α -syn and total protein concentrations in vitro. Ten materials were incubated in pooled reference saliva samples for 30 minutes and 17.5 hours. α -syn was quantified by Luminex while total protein was quantified by a Bradford assay. Cotton (A,

30min and 17.5hr) and gum (B, 30min) significantly reduced α -syn, while harder surfaced materials generally did not have a significant effect. Total protein was not significantly influenced by the tested materials. The results of this experiment demonstrate that several materials appear to have no impact on either total protein or α -syn concentration, and may be suitable for increasing sample availability without drastically altering native protein composition.

POSTER SESSION 4

Balcony, Easel 103

4:00 PM to 6:00 PM

Inspired, Low-Cost Methods of Purifying Water

Natalie Gray, Junior, Environmental Science & Resource Management

Salina Abraham, Sophomore, Environmental Science & Resource Management

Logan Carter, Junior, Anthropology: Medical Anth & Global Hlth

Mentor: G. Graham Allan

Created as a platform to begin discussion regarding water crises and how to address them, *Inspired, Low-Cost Methods of Purifying Water* is a technological examination of unique systems that can be used by small, resource-limited communities to alleviate the impact of physical and economic water scarcity. Our article is a shortlist of cleverly-crafted, atypical, low-cost, efficient methods of redeeming water. We crafted this inventory by considering over 45 separate methods and selecting applicable techniques based on their relative levels of feasibility, efficiency, sterility, approximate cost, and environmental impact. By generating unusual alternatives to water purification, we hope to provide an opportunity for the global community to discuss and implement new projects concerning the alleviation of public health issues regarding access to water, improving local productivity in agricultural systems, and resource sustainability.

POSTER SESSION 4

Balcony, Easel 111

4:00 PM to 6:00 PM

The Phosphorylation of p120 Catenin Mediates Cell Motility and Adhesion in Zebrafish

Hiroko Nakahara, Senior, Biology (Physiology)

Mentor: Merrill Hille, Biology

p120 catenin is an essential protein in the development of embryos, it is associated with the regulation of cell migration and adhesion during development. We propose that p120 catenin phosphorylated on tyrosine residues binds to the cytoplasmic tail of E-cadherin to stabilize and strengthen adhesion. In contrast we propose that when p120 catenin is

phosphorylated on serine or threonine residues, it is released into the cytosol to regulate Rho-GTPase to facilitate cell migration. Two regulatory domains of p120 catenin contains serine/threonine residues that can be phosphorylated to allow cell migration and adhesion. I am modifying the phosphorylation sites to amino acid residues that lack the ability to be phosphorylated (serine/threonine to alanine) or to amino acids that are constitutively charged to mimic phosphorylation (serine/threonine to glutamic acid). By modifying these residues, we hope to distinguish phosphorylation sites that are essential for the adhesion and migration of cells during development. To test these modified residues, we inject splice site antisense morpholino into one-celled zebrafish embryos to knockdown the endogenous expression of p120 catenin, thus inhibiting somite formation and dorsal axis extension. The modified p120 catenin mRNAs are co-injected with anti-sense morpholino and the development of the embryos are compared with the embryos that were rescued with wild-type p120 catenin mRNAs. Data from the injection of p120 catenin mRNAs with threonine 910 to alanine or glutamic acid mutation rescues normal phenotype. These data suggests that the phosphorylation of threonine 910 is not essential for cell motility. Currently, I am studying another phosphorylation sites on the C-terminal end of p120 catenin, serine 879 to see if it is essential for cell adhesion and migration.

POSTER SESSION 4

Commons East, Easel 44

4:00 PM to 6:00 PM

CherryTime: Non-Profit Charity Connector

Mariam Davis, Senior, Informatics

Vivian Teng, Senior, Informatics

Cameron (Cam) Scotland, Senior, Informatics

Brandon Thai, Junior, Informatics

Mentor: Nam-ho Park, Information School

Volunteering in America has been declining in recent years. Due to minimal community support, some non-profit organizations are struggling to obtain necessary items. To address this problem, our capstone project will create a platform to effectively communicate requests from Seattle non-profit organizations to local altruists. Our application, CherryTime, will enable organizations to make specific requests for items or volunteers. We will be developing a mobile-friendly website where locals will be able to fulfill these requests. Individuals will have the ability to look for opportunities based on location, time, causes they support or skills they have. Their donations and time volunteering will be rewarded through our badge system. Our project will help create a two-way relationship between organizations and individuals. The goals of this project are to increase the number of donors and volunteers in Seattle, make it easier for non-profit organizations to

communicate their needs and to raise awareness for charity groups and their needs.