RERF Fall 2012 award

- Title: "Robots for Automated Liquid Handling and Solid Phase Extraction"
- Instruments: Five Biotage Rapidtrace SPE Workstations, Tecan EVO 100 liquid handling robot equipped with a shaker module
- PI: Maret G. Traber, PhD
- Organization: Linus Pauling Institute
- Award Information: Research Equipment Reserve Fund (RERF), March 4, 2013
- Amount: $69,404

Final budget statement

Our original intent was to purchase two Gilson liquid-handling robots configured for cartridge-based solid phase extraction (SPE). However, once the award was announced, we conducted additional research to be sure we had chosen the best alternative. Instead, we discovered that by purchasing one instrument for SPE and another for liquid handling (accurate and reproducible measurement and dispensing of liquids, including solvents, buffers, reagents, and internal standards), we could gain greater capability that would benefit more researchers, although at greater cost. LPI Director, Dr. Balz Frei agreed to supply the needed additional money.

At a cost of $52,906, five Biotage Rapidtrace SPE Workstations were purchased to replace the four aging SPE robots, which were used as a trade-in. RERF ($30,000) and LPI ($22,906) funds were used for the purchase of these robots. The robots were installed and placed in service on August 28, 2013.

A Tecan EVO 100 liquid handling robot equipped with a shaker module was purchased at a total cost of $73,973.84. RERF ($39,404.00) and LPI ($34,569.84) funds were used for the purchase of this robot. This instrument was installed and placed in service on October 21, 2013.

Scholarly work/activities made possible as a result of the RERF funding.

The Biotage Rapidtrace SPE Workstations are a key part of the services and equipment in the Oxidative Nitrosative Stress core lab (ONSL), which are available to all LPI investigators and their staff and students. The ONSL facilities and services are also used by collaborators of the LPI investigators both at OSU and at other institutions. The SPE robots are used for sample preparation and are among the most highly used equipment in the ONSL.

Additionally, the LPI laboratories educate and train a large number of undergraduate and graduate students in a number of different disciplines, thus this acquisition supports the continued training of these students, a key principle of the OSU research agenda.

The Tecan Freedom Evo 100 robotic platform has been used in conjunction with Freedom Evoware software is a new tool in the development of sample preparation for analysis. This equipment can handle various liquids including aqueous liquids, organic solvents, and liquid biologic samples. We have been developing protocols and comparing the new methods to our existing approaches.

The versatility of the Evoware software has enabled lab technicians to write diverse program scripts to fit the needs of particular sample preparations for multiple analytical assays. The robotic platform can be easily re-arranged. This allows quick transitions from one experiment to another. Since program scripts can be saved, other researchers can follow protocols without needing extensive experience with the Evoware software. The novice need only select the particular script for the experiment of choice. Once initiated, a script will run to completion.
without assistance, thus freeing up the operator’s time. We have found that repeat samples can be measured with a coefficient of variation of less than 3%, which we anticipate will make this equipment very popular.

The liquid handling system is equipped with interchangeable pipetting volumes permitting a desired level of precision for quantitative analyses. The liquid level detection aspiration option provides a valuable tool for pipetting accuracy thereby reducing potential error. The size of the robotic platform affords opportunity for researchers who require analysis of extensive sample quantity for both large and small assay volumes. Such large assay volumes include a program that may simultaneously prepare up to 80 plasma samples for vitamin E saponification. The system has also been equipped with 96-and 384-well plates.

In addition to pipetting samples and extraction solvents, methods for liquid-liquid extraction using Evoware technology have been developed supplying future benefit for multiple investigators using this invaluable technique. Mixing and shaking options are available as well. Lastly, Tecan engineers have created a new extraction technology for capturing hydrophobic molecules from an aqueous medium, for example: tocopherol and vitamin K from blood, and have provided our laboratory with the tools for this procedure.

**List all external funding requests that have been developed and submitted as a result of the RERF funding (i.e. proposals).**

The following individuals have submitted proposals to the NIH in the last 6 months, which will use the ONSL facility and the newly acquired robots:

**Balz Frei, Ph.D.**  
Distinguished Professor  
Dept. Biochemistry & Biophysics  
Director & Endowed Chair, Linus Pauling Institute  
(541) 737 5078  
baz.frei@oregonstate.edu

**Adrian Gombart, Ph.D.**  
Associate Professor  
Dept. Biochemistry & Biophysics  
(541) 737 8018  
Adrian.gombart@oregonstate.edu

**Emily Ho, Ph.D.**  
Professor  
School of Biological & Population Health Sciences  
541-737-9559  
emily.ho@oregonstate.edu

**Donald Jump, Ph.D.**  
Professor  
School of Biological & Population Health Sciences  
Director, Nutrition Graduate Program  
(541) 737 4007  
Donald.jump@oregonstate.edu

**J. Frederick Stevens, Ph.D.**  
Associate Professor  
Dept. Pharmaceutical Sciences  
(541) 737 9534  
Fred.stevens@oregonstate.edu

**Maret G. Traber, PhD**  
Professor, Linus Pauling Institute  
College of Public Health and Human Sciences  
(541) 737 7977  
maret.traber@oregonstate.edu