

# URGE to Compute 2013 URGE Apprenticeship Application

We are delighted you are considering being part of URGE to Compute.

URGE to Compute is an intense immersion program in collaborative research in the computational mathematical sciences for an annual cohort of 12 undergraduate mathematics majors\*. URGE stands for Undergraduate Research Group Experiences.

These research experiences will provide opportunities for creativity unlike anything heretofore encountered by most undergraduates in mathematics. The projects are flexible, open-ended, and have great scope for inventiveness and spontaneity: often we repeat with a chuckle Einstein's remark that if we knew exactly where we are going, "it wouldn't be called research, would it?" And yet, cognizant that "chance favors the prepared mind" (Pasteur) and that "genius is 1% inspiration, 99% perspiration" (Edison), the URGE experiences are carefully structured to provide thorough preparation and support according to each individual student's needs, and at the same time, a great deal of commitment and sustained hard work is demanded from all participants.

A collaboration of the University at Buffalo, Buffalo State College, and the Hauptman-Woodward Medical Research Institute, the program brings together a diverse interdisciplinary group of 17 active faculty researchers in whose work computation plays a central role, and who are committed to providing the best possible preparation for future leaders in the computational mathematical sciences.

The year of research begins in the Spring semester of the students' junior\*\* year with: a support course that provides mathematical and scientific background on the theme that unifies all the research projects for that year; a team-taught course on the tools, methods, and craft of computational research; regular meetings with the research project mentor; and the first part of a seminar that runs throughout the year. Research continues through the summer, and students write an honors thesis and/or a paper for publication in the Fall. Computational resources available to the students include the facilities of UB's Center for Computational Research, which include a 2000-node cluster and visualization laboratory. Talks by eminent outside researchers are a feature of the seminar, and students attend a national conference in an area related to their research, disseminate their results at regional meetings and local exhibitions of undergraduate scholarship, and participate in outreach activities at local high schools. During the year, the 12 "URGE Apprentices" receive a stipend of approximately \$9400 plus summer accommodation assistance, whose purpose is to allow them not to have other employment, and focus entirely on their academic activities. After the year is over, in their final undergraduate semester, the now highly trained URGE Apprentices serve as teaching assistants in the introductory differential equations course that is taken by all mathematics, engineering, and science students.

URGE to Compute provides for mathematics majors unprecedented opportunities for academic and personal development, and we hope that after reading this brief description of the program, you are inspired to apply.

To apply to be a 2013 URGE cohort member, please fill out the attached forms and return them to:

Prof. John Ringland  
Mathematics Department  
University at Buffalo  
ringland@buffalo.edu

Prof. Joaquin Carbonara  
Mathematics Department  
Buffalo State College  
carbonjo@buffalostate.edu

**Recommendations:** In addition to the application form from you, **two recommendations** from university/college professors or instructors are required. At least one of these must be from a Mathematics Department. The required recommendation form is here: [http://copper.math.buffalo.edu/ugs/csums/urge2013\\_recommendation\\_form.pdf](http://copper.math.buffalo.edu/ugs/csums/urge2013_recommendation_form.pdf).

Applications for 2013 are being accepted **now**. The deadline is September 30, 2012, but the earlier received the better, and we would appreciate receiving an email stating your intent to apply ASAP. If you have any questions, feel free to contact either Prof. Ringland or Prof. Carbonara.

\*Students in other majors should talk to us about double-majoring.

\*\*Unusually well prepared sophomores, and even freshmen, are also eligible.



URGE to Compute is funded by the National Science Foundation CSUMS Program.

# URGE to Compute

## Senior personnel include:

Prof. John Ringland	PI & research project mentor	UB Mathematics Dept
Prof. Joaquin Carbonara	PI & research project mentor	BSC Mathematics Dept
Prof. Bruce Pitman	Co-PI & research project mentor	UB Mathematics Dept
Prof. Surajit Sen	Co-PI & research project mentor	UB Physics Dept
Prof. Deborah Moore-Russo	Co-PI, program evaluator	UB Dept of Learning and Instruction
Prof. Saziye Bayram	Research project mentor	BSC Mathematics Dept
Prof. Gino Biondini	Research project mentor	UB Mathematics Dept
Prof. Valentin Brimkov	Research project mentor	BSC Mathematics Dept
Prof. Tom Cusick	Research project mentor	UB Mathematics Dept
Prof. Richard Gonsalves	Research project mentor	UB Physics Dept
Dr. Shawn Matott	Research project mentor	UB Center for Computational Research (CCR)
Prof. Jae-hun Jung	Research project mentor	UB Mathematics Dept
Prof. William Menasco	Research project mentor	UB Mathematics Dept
Prof. Hun Ngo	Research project mentor	UB Computer Science and Engineering Dept
Prof. Atri Rudra	Research project mentor	UB Computer Science and Engineering Dept
Prof. Brian Spencer	Research project mentor	UB Mathematics Dept
Prof. Hongliang Xu	Research project mentor	BSC Mathematics Dept
Prof. Eva Zurek	Research project mentor	UB Chemistry Dept
Prof. Thomas Furlani	Consultant	Director, UB CCR

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If you wish to fill out this application digitally, the source document in OpenDocument format (use OpenOffice or LibreOffice) is here: [http://copper.math.buffalo.edu/ugs/csums/urge\\_application\\_2013.odt](http://copper.math.buffalo.edu/ugs/csums/urge_application_2013.odt).

Name: \_\_\_\_\_ Email: \_\_\_\_\_

UB person number: \_\_\_\_\_ or BSC Banner number: \_\_\_\_\_

Intended graduation date (month/year): \_\_\_\_\_

Courses completed or currently registered for:

Mathematics:

	Sem/Year	Institution	Course#	Grade
Calculus I _____	_____	_____	_____	_____
Calculus II _____	_____	_____	_____	_____
Calculus III _____	_____	_____	_____	_____
Differential Equations _____	_____	_____	_____	_____
Linear Algebra _____	_____	_____	_____	_____
Applied Math _____	_____	_____	_____	_____

Computer programming (one course required):

	Sem/Year	Institution	Course#	Grade
Intro Computer Science I _____	_____	_____	_____	_____
Intro Computer Science II _____	_____	_____	_____	_____
UB MTH 337 _____	_____	_____	_____	_____
UB MTH 437 _____	_____	_____	_____	_____
Other _____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Other Computer Science background (**not** required):

Data Structures (e.g. UB CSE 250)

Algorithms (e.g. UB CSE 331)

	Sem/Year	Institution	Course#	Grade
Data Structures (e.g. UB CSE 250) _____	_____	_____	_____	_____
Algorithms (e.g. UB CSE 331) _____	_____	_____	_____	_____

Other programming experience:

Previous research experience (none required):

Other relevant experience/information:

Please write a brief statement addressing outlining your aspirations and career goals, and your specific mathematical and scientific interests.

Please tell us about any experience you have had collaborating with a group towards a common goal, or say why you think you can be a good team player.

Describe your expectations for a research experience such as this. What do you hope to get out of it?

What do you think you can contribute to the group experience?

What are your extracurricular interests and activities?

I understand that to be part of this program I must commit to being available for all the URGE group activities, which include:

- taking the Theme Support Course (TBD) , the Tools and Methods Course, and the URGE Seminar,
- participating in regular meetings with my mentor throughout 2013,
- conducting intensive research work with my group for 15hrs/week during the Spring 2013 and Fall 2013 semesters, and 40hrs/week for 8 weeks during the summer of 2013, and filling out biweekly timesheets that specify how the time is spent,
- traveling to a conference outside of NY state, to an out-of-town regional conference, and periodically between UB North Campus, Buffalo State College, and CCR in downtown Buffalo.
- consider being a TA in Spring 2014.

Yes: \_\_\_\_ No: \_\_\_\_

Will you have any commitments in Sp2013, Su2013, Fa2013, Sp2014 that could possibly interfere with your full engagement in URGE to Compute?

Yes: \_\_\_\_ No: \_\_\_\_

If yes, explain:

I pledge that if I am awarded and accept an URGE Apprenticeship I will not engage in any employment during Spring and Fall 2013 semesters or during the 8 weeks while on stipend in the Summer of 2013.

Yes: \_\_\_\_ No: \_\_\_\_

Whom have you asked to write recommendations for you?

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I certify that the information I have provided above is accurate and complete.

Applicant signature and date: \_\_\_\_\_

One more thing...

**A research study on the effectiveness of URGE to Compute program:**

We hope you will be willing to help the URGE to Compute program by participating in a research study designed to assess the program's effectiveness. If so, please completely read the attached documents and sign the necessary form. Participation in the study is optional, but takes little time and is completely explained in the following pages.

UNIVERSITY AT BUFFALO, STATE UNIVERSITY OF NEW YORK

## Informed Consent Document

This consent form explains the research study. Please read it carefully. Ask questions about anything you do not understand. If you do not have questions right now, you should ask them later if any come up.

### **FOR QUESTIONS ABOUT THIS RESEARCH, CONTACT:**

This study is being conducted by Dr. Deborah Moore-Russo ([dam29@buffalo.edu](mailto:dam29@buffalo.edu)). Dr. Moore-Russo can be reached through the Department of LAI, University at Buffalo, Amherst NY 14260 or by telephone at (716)645-2455 ext. 1266.

If you have any questions about your rights as a participant in a research project, you should contact (anonymously, if you wish) the Social and Behavioral Sciences Institutional Review Board, 515 Capen, University at Buffalo, Buffalo, NY 14260, e-mail [SBSIRB@research.buffalo.edu](mailto:SBSIRB@research.buffalo.edu), phone (716)645-6474.

### **PURPOSE:**

You are invited to participate in a research project that examines the impact of the *URGE to Compute* program. The results of this study should help to further our understanding of whether and how research experiences impact undergraduates. This understanding will help us (and others) to develop more effective undergraduate research experiences. All those applying to the *URGE to Compute* program will be recruited to participate in this research study, which should be approximately 50 participants.

### **PROCEDURES:**

By participating in this study, you are agreeing to let the study investigator have access to your records related to the *URGE to Compute* program, should you be chosen as a participant. The study investigator is also requesting access to the academic records for all those applying to the *URGE to Compute* program for comparison purposes. You will also be asked to complete an open-end survey towards the end of your tenure in the *URGE to Compute* program should you be selected as a participant. Filling out the questionnaire should take about 10 minutes.

You are not required to participate in this research study, and your participation will not impact the selection committee's decision as to whom will be chosen to participate in the *URGE to Compute* program. You also have the option as to which records (your academic records, your records related to the *URGE to Compute* program, or both) you will allow access to without any impact to your selection in the *URGE to Compute* program. This is reflected by the options you choose at the end of this form. If at anytime you wish to withdraw from the study, you may do so without any consequences by contacting Deborah Moore-Russo (see her contact information above). Again, you may withdraw from the study at any time. Just let the study investigator know that you no longer wish to continue in the study. Withdrawing from the study would have no foreseeable negative effects.

### **CONFIDENTIALITY:**

Information will be obtained confidentially, recorded confidentially and later made anonymous once you have finished your tenure in the *URGE to Compute* program. More specifically, the research study investigator, Deborah Moore-Russo, will gather the names of those persons will to serve as study participants and immediately code all of their data by a code name. The investigator will keep a master list that links all the code names to the person numbers for the study participants. The master list will be kept in a separate locked file cabinet from the locked file cabinet in which the data will be stored. All names will be removed from the data. The research study investigator will compile and correlate all the data from the end of the person's tenure in the project matching it to the data from the same research subject at the beginning of the study using the master list to match the code names on

the data to the corresponding person number. Once all data is correlated, the master list will be destroyed. The data will then be compiled and reported for all those students who applied to the *URGE to Compute* program without any identifiable features.

The open-ended survey will be submitted without names or identifiable features. The study investigator will compile all the submitted surveys into a single group report eliminating any information from that data that might be identifiable to a study participant. The survey data will be kept in a locked file cabinet until it is destroyed, which will be within one week of its receipt.

### **RISKS:**

There is a potential of breach of confidentiality in that someone might access the study investigator's files (an action that would be done without her consent since she is the only one to have access to this data) in her locked office and in that manner be able to collect the data as listed by code name as well as to collect the master list linking the code name to the person number. Should this be done, the only risk would then be that the same person then had access to UB's student databases to be able to match the person with their person number. By storing data coded by a code name only until all data is correlated, and then eliminating the master list that shows the person number that is related to the code name from the data base as soon as the person's tenure in the *URGE to Compute* program is done, reduces the risk factors, as does the fact that only the investigator will have access to this data, and she will keep it in a locked office.

There is also the potential of breach of confidentiality if someone answers one of the open-ended survey questions in such a manner that is identifiable. However that data will be stored in a locked file in a locked office for just one week before the investigator completed a report on the group, and the data are destroyed. Note the study investigator will strip all data of any identifiable features in the group report.

### **BENEFITS:**

If there are no direct benefits to participants state that fact and then describe the indirect benefits. There are no anticipated direct benefits to you for participating in this study but the study will assist the academic in developing better research experiences in the future.

### **COSTS and COMPENSATION:**

There is no cost to you for participation in this research. There is no compensation provided for participation in this study.

### **JOINING OF YOUR OWN FREE WILL (VOLUNTEERING FOR THE STUDY):**

Your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled as applicant to the *URGE to Compute* program. You do not have to answer every survey question and may refuse to answer any questions that you do not want to answer. You may withdraw from the study at any time by contacting the investigator and all data that can still be identifiably attributed to you will be withdrawn by the investigator.

**(continued on next page)**



**SUBJECT STATEMENT:**

I have read the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study. I HAVE BEEN GIVEN A COPY OF THIS CONSENT FORM.

**SIGNATURE OF SUBJECT (student applicant to URGE to Compute) and DATE**

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**SUBJECT CONSENT TO ACCESS TO ACADEMIC RECORDS**

\_\_\_\_\_ (Please initial.) I agree to allow the study investigator to have access to my academic records.

"I certify that I obtained the consent of the participant whose signature is above. I understand that I must give a signed copy of the informed consent form to the participant, and keep the original copy on file in the repository location designated on my IRB application files for 3 years after the completion of the research project."

**SIGNATURE OF INVESTIGATOR (or PERSON OBTAINING CONSENT) and DATE**

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