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Student Technology Fee Proposal #2015-52
TVR/Multimedia Lab Upgrade

School: School of Visual, Media and Performing Arts
Department/Office: Television and Radio
Applicant Name: Cheong, Young
Additional Applicant(s): Maclelland, Stuart
Primary Contact for Proposal
Email Address: CYOUNG@BROOKLYN.CUNY.EDU
Phone: 718-951-5555
Estimated total cost: \$ 49,000.00

Description of Proposed Project:

We, here at the Department of Television and Radio, are requesting a replacement of 8 iMac workstations in our Multimedia Lab with Mac Pro workstations. Most of our lab computers have been heavily used and because of its flawed design, most of iMacs cannot connect to slow external hard drives. This affects our students who expect to work off of his or her hard drive. We also need the technology to follow the current High Definition video editing demands that we have implemented into our curriculum.

The old iMacs in the Multimedia Lab, in general, cannot readily meet the demands of broadcasting-quality HD video footage. In the past, we have only allowed access of our HD technology to our graduate students only. However, we are offering this technology to our undergraduate students as well. We currently have full HD curriculum added to production classes. For the purposes of editing, USB 2.0 on the 2009 model iMacs in the lab provide too slow of a data rate for HD editing. The USB 3.0 and Thunderbolt 2 ports on the Mac Pros are much more suitable for handling HD footage. For example, many students opt to buy USB 3.0 portable hard drives and unfortunately only get the speed of USB 2.0 on the outdated iMacs. The newer Mac Pros are also ?future-proofed? because they can support the newer 4K displays, along with current Thunderbolt displays. Thus, we need computers that will enable the department to keep up with the demands of technology.

For the Current Mac Pros, the Department would need Solid Slate Hard Drives and updated graphic cards in order to fully utilize the power and speed of the Mac Pros. Mac Pros with an outdated graphic card or an old hard drive will not run at optimal efficiency and is very cumbersome to edit with.

For networking, the network switch in the Multimedia lab is about fifteen years old and is very outdated. A new network switch would allow for students to share their files very easily. This allows students to watchband edit their video clips from any other workstations in the lab.

The requested items are as follows:

For New MacPro

(x 8) Apple 6- Core Mac Pro 3.5GHz, 32GB RAM (\$4200) :\$33,600

(x 8) 27-inch Apple LED Thunderbolt Display (\$949) : \$7,592

(x 8) 1TB Samsung Solid Slate Internal Drive (\$450) : \$4,500

(x 4) EVGA GeForce GTX 680 Graphics Card (\$550) : \$2,200

Pro Curve HP 48 port 1GB Switch\$1,500

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

The Department of Television and Radio strives to prepare students for the job market. We want to simulate real-world job experience. Our curriculum includes multi-cam and editing classes. Including Mac Pros in the curriculum would allow students to take advantage of current HD and 4K technology, which are essential tools in the field.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

b. Who will supervise the facility and how will that be funded ongoing:

Full time staff at our current department will oversee equipment.

c. What physical space will be used to host the facility, and who has authorized its use:

We have a multimedia lab in the room 307, Whitehead Hall, and it is the department who that is in charge of authorizing its usage.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

No renovations or furnishings are required.

Please describe how many students will be served each term through the funding of this project, and through what means:

Most of our students, graduate and undergraduate level, roughly 480 students TV/Radio students will use this equipment throughout the year, in addition to students from the English Department who use the lab for some of their classes. This includes some of our future photojournalists in the broadcast journalism program. Moreover, we have a great working relationship with the journalism department and sometimes we share our resources. Thus, we hope to continue to extend our relationship by sharing various tools such as the iMac and Mac Pro computers with the Journalism Department.

How will projected outcomes be assessed?

The objective is to meet the demands of our graduate and undergraduate programs. Our program in the Department of TV and Radio has already implemented HD into our entire curriculum. With the upcoming transition from HD to 4K video, the outcomes would be immensely beneficial to students. The new Mac Pros can easily handle 4K files in addition to a variety of video formats. By upgrading technology, the curriculum of our faculty members would not be limited and they will have the teaching power to deal with 4K video which will become the industry standard.

Student Technology Fee Proposal #2015-50
Undergraduate Field Camera Proposal

School: School of Visual, Media and Performing Arts
Department/Office: Television Center
Applicant Name: Corbet, Jeanine
Additional Applicant(s): Grossberg, Richard
Primary Contact for Proposal
Email Address: JCorbet@brooklyn.cuny.edu
Phone: 718-951-5585
Estimated total cost: \$ 68,000.00

Description of Proposed Project:

To fund the purchase of 20 new HD camcorder kits needed for undergraduate production classes. These classes are required for TVR majors which are the majority of the population we serve - there are now close to 400 undergraduates that will utilize our equipment during their time at BC.

These two models will replace our old/existing stock, some of which have already been pulled from service due to excessive wear and tear. The Sony PXW is a smaller form factor camera suitable for news and documentary production. The Canon XF is slightly larger and more advanced camera suited for all types of professional production. The kits contain an additional battery along with the proper carrying case as do all our cameras.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

These cameras are only used for required coursework - - most of our students do not have and cannot afford this type of professional HD video equipment. Access to professional video equipment and instruction in its proper usage is the cornerstone of all video production classes.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

50+

b. Who will supervise the facility and how will that be funded ongoing:

Current full-time staff and designated CA's will continue to handle equipment distribution. Daily operations are overseen by the Operations and Production Manager along with our Chief CLT.

c. What physical space will be used to host the facility, and who has authorized its use:

Whitehead 001 - TV Center Equipment distribution. Only authorized staff have access to this space.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

N/A

Please describe how many students will be served each term through the funding of this project, and through what means:

On average we have over 100 undergrads that use these cameras during the regular semesters with a current ratio of 7.5 students per camera. This means that during peak times we often do not have enough supply to meet the demand and must turn students away. Adding new cameras and retiring non-working ones will help us reduce the ratio to 4 students per camera which is more on par with other CUNY schools that have similar programs.

How will projected outcomes be assessed?

We can easily track equipment usage through our booking system. More cameras will allow more student requests to be processed. Both students and Instructors will benefit from the upgrade and increase in inventory.

Student Technology Fee Proposal #2015-61
Conservatory of Music Technology Upgrades

School: School of Visual, Media and Performing Arts
Department/Office: Music, Conservatory of
Applicant Name: Geers, Douglas
Additional Applicant(s): Davis, Susan
Cohen, Douglas

Primary Contact for Proposal

Email Address: DGeers@brooklyn.cuny.edu
Phone: 646-628-2699

Estimated total cost: \$ 12,769.00
This project was approved in the prior STF year pending funding availability and was not yet funded

Description of Proposed Project:

This request is in large part a duplicate (combined) of the two requests that were approved last year. Unfortunately the College had a funding shortfall and these grants were delayed. We request that they be re-funded this year.

The portions of the grant carried over from 2013-14 are:

1. Purchase and installation of two SMARTBoards in classrooms in the Roosevelt Extension, rooms 400A and 400C. (estimated cost: \$10,942)
2. An amplification system to facilitate outdoor music performances on campus. (estimated cost: \$1827)
3. Music composition and performance tools. (estimated cost: \$9,388)

The new part of the grant is the additional request of 20 iMac computers for our Music Technology lab and Advanced Computer Music lab (116RE and 118RE). The former is a fifteen-workstation classroom and the latter a five-workstation classroom and composition studio. Assuming a cost of approximately \$2,000 per computer, this additional request totals to about \$40,000.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

For this section, we will discuss the four application components one at a time.

1. Smart boards

This request will enhance student learning in all classes that meet in these classrooms. Ear training and theory classes can benefit from web-enhanced instruction, the projection of music scores for class study and the interactive whiteboard as a means toward enhanced analysis of these scores. The music education classes will benefit from training with a SMARTBoard in terms of gaining technological facility and they will benefit from being able to design and implement interactive lesson plans that meet the demands of the Danielson Framework for effective teaching, and the demands of new teacher certification exams.

The objectives of this proposal are to support our students in their pursuit of becoming skilled communicators, leaders, and innovators who are prepared to meet the career demands in the 21st century.

The use of SMARTBoards in our classrooms allows us to vary instruction, differentiate for multiple student needs, involve students in designing and implementing instruction and presentations, create multi-media experiences indispensable to music learning, and include global experiences through connection with the outside world.

The most critical aspect of the SMARTBoard in this request is to provide training, experience and career readiness opportunities for our Music Education students preparing to be teachers. As part of the most recent reform agenda, NYC DOE schools are installing SMARTBoards in their classrooms to enhance learning. Our Brooklyn College students studying to be teachers need the experience and training with this new technology in order to be fully prepared and more effective teachers. Working with actual interactive SMARTBoards in our classrooms would give them the familiarity with the technology and the opportunity to design more effective interactive instruction.

2-3. Amplification system and composition/performance tools

Currently some student performances are under served because we do not have the proper system available to amplify them, in particular for outdoor performances. The requested PA system will make them audible.

The composition and performance equipment will extend our offerings for students to get hands-on experience with professional-quality creative tools as part of their experience at Brooklyn College. We want our programs to be among the best in the USA. To achieve this, we have developed two new MFA programs that will launch in 2015. Meanwhile, we want to both serve current students and acquire the equipment necessary for our facilities to function as a top-tier educational institution in electroacoustic music and composition. These tools will enable us to do so.

The objectives of this project are to improve presentation quality of student performances on campus, and to extend the compositional and performance possibilities.

4. New iMacs for Music Technology labs

The iMacs currently in our labs are all from 2009—five years old at the time of this application in fall 2014. Although they have served admirably, it is past the time when we should upgrade these computers. Given that several crucial and industry-leading music software applications continue to be available only for Macintosh, we request iMacs rather than PCs. And because of the importance of a large visual display for students to see large scores and complex audio mixes, we request iMacs with 27-inch screens. These labs are used in several courses already, and with the 34 new courses in Scoring and Sonic Arts beginning to be offered in rotation in fall 2015, we anticipate that use of the facilities will increase dramatically.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

30

b. Who will supervise the facility and how will that be funded ongoing:

Note that the only one of the four components above that is in regards to a public access technology lab is item #4, the new iMac computers.

Fifteen of the requested computers will be placed in 116RE, the main Music Technology lab and classroom. This lab is supervised by the Dir. of Music Technology, the Dir. of the BC-CCM, and the Music Technology Graduate Fellow. Graduate CAs, FWS students, and students on internships monitor the lab.

c. What physical space will be used to host the facility, and who has authorized its use:

116Roosevelt Extension, which has been used for this purpose since 2010, authorized by BC administration (Dean Conelli, Provost, etc.)

d. If any renovations or furnishings will be required to support the project, how will they be funded?

No.

Please describe how many students will be served each term through the funding of this project, and through what means:

For this section, we will discuss the four application components one at a time.

1. Smart boards

At a minimum, 188-243 students for each fall semester and 175-220 for each spring, but this number could increase by about 30 more students each term with the technology in place.

Fall term classes currently include Ear Training (60-75 students), Music Theory (50-72), Basic Concepts in Music Education (17-20), Music Education Colloquium (25-32), Elementary Methods (18-22), and Special Education Methods (18-22). Spring term classes currently include Ear Training (60-75), Music Theory (50-72), Secondary Methods (18-22), Music Education Colloquium (25-32), Student Teaching Seminar (12-16), Foundations in Music Education/Special Topics (10-15).

*With the SMARTBoards in place, other Music Education methods classes should be moved into these spaces, so that more students can be served by this technology. For example, Voice Production (10-15), Upper Strings (10-

15), Woodwind Methods (10-12), Brass Methods (10-12) and Fretted Instruments (10-15).

2-3. Amplification system and composition/performance tools

This equipment will serve a wide array of music students. The PA system will be available for all Music students who present performances on campus that require amplification. Although numbers will vary from semester to semester, this could include any of the nearly 250 Music majors, as well as others in music ensembles. Other students, campus denizens, and families will benefit by actually being able to hear the music performed.

The composition and performance tools will serve all music composition majors (30 students), as well as all students in the following courses: MUSC 1300 (Music Core - hundreds per semester); MUSC 3260, Introduction to Music Technology (15-20 per semester); MUSC 3261, Electroacoustic Music 1 (15-20 per semester); MUSC 3262, Electroacoustic Music 2 (15-20 per semester); MUSC 3263, Building Electronic Music Instruments (15-20 per semester); MUSC 3322, Audio Recording Techniques (15-20 per semester); and the Electroacoustic Ensemble (5-10 per semester). With the new Sonic Arts MFA, as well as the MFA in Scoring for Media, which is to launch in fall 2015, about 12 additional courses and 40 additional students will be affected per semester. PIMA 7741 and 7742 have also used our labs and these tools as well (approximately 30 students).

4. New iMacs for Music Technology labs

The new computers will serve all users and students in both the 116RE and 118RE Music Technology labs. These include all those listed above regarding the composition and performance tools, plus other students and faculty who may not be currently teaching or enrolled in a course that uses the labs but who continue to work there or present occasional workshops, performances, etc. In short, these new computers will benefit several hundred Brooklyn College students every semester.

How will projected outcomes be assessed?

For the SMARTboards, student outcomes would be assessed through class presentations, micro-teaching opportunities and collaborative projects with the SMARTBoard.

For the amplification system, composition/performance tools, and new iMac computers, student outcomes will be assessed as these tools are used in our courses. We will instruct students, test their understanding by means of quizzes and projects, and will solicit feedback regarding the success of our implementation of the equipment.

**Conservatory of Music
2014-15 STF Grant Application
BUDGET**

SMARTboards

- SMARTBoard interactive whiteboard model x880 with UF70 Projector: \$3700.00 (for 400A)
- SMARTBoard interactive whiteboard model x880 with UF70 Projector: \$3700.00 (for 400C)
- PC to connect to the SMARTBoard: \$1000.00 (ITS estimate) (for 400A)
- PC to connect to the SMARTBoard: \$1000.00 (ITS estimate) (for 400C)
- Installation of SMARTBoard: \$750.00 (ITS estimate) (for 400A)
- Installation of SMARTBoard: \$750.00 (ITS estimate) (for 400C)
- 2 USB Mini adapters for laptop: \$42

SUBTOTAL: \$10,942.00

Portable PA system for Lilypond concerts and other public events:

1.	Gator mixer case G-MIXB 15x	\$29
2.	Horizon 20' mic cable NLZ-20-BPA (2 @ \$12.90 ea.)	\$25.80
3.	Horizon 50' mic cable NLZ-50-BPA (2 @ \$24.90 ea.)	\$49.80
4.	K&M mic stand w/ boom 210/9B (2 @ \$ 59.90 ea.)	\$119.80
5.	Onstage (2) speaker stands & bag combo SSP7950	\$69.00
6.	QSC 10" Powered PA loudspeaker K10 (2 @ \$559 ea.)	\$1,118.00
7.	QSC powered loudspeaker tote bag (2 @ \$59 ea.)	\$118.00
8.	Shure SM-58LC microphone (2 @ \$83 ea.)	\$166.00
9.	Yamaha MG82CX mixer	\$129.99
	SUBTOTAL	\$1,826.38

Music Composition and Performance Tools

10	Theremin- Etherwave Plus (2 @ \$519 ea.)	\$1038
11	EuroRack analog synthesizer	\$3500
12	East West Sample Library	\$1500
13	Metric Halo A/D/A w/ DSP	\$2450
14	Tascam Zoom portable audio recorders (2 @ \$250 ea.)	\$500
15	Glyph 1 TB porta Gig hard drive (2 @ \$200 ea.)	\$400
	SUBTOTAL	\$9,388

iMacs

- 3.2GhZ quad-core, 27-inch screen, 16GB RAM, 1TB solid state drive, Applecare
- 27 computers @ approximately \$2,000 ea. with academic discount

SUBTOTAL: circa \$40,000

MUSIC REQUEST TOTAL: \$62,157

Student Technology Fee Proposal #2015-69
Conservatory of Music Technology Upgrades

School: School of Visual, Media and Performing Arts
Department/Office: Music, Conservatory of
Applicant Name: Geers, Douglas
Additional Applicant(s): Davis, Susan
Cohen, Douglas

Primary Contact for Proposal

Email Address: DGeers@brooklyn.cuny.edu
Phone: 646-628-2699

Estimated total cost: \$ 40,000.00
This project was approved in the prior STF year pending funding availability and was not yet funded

Description of Proposed Project:

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30

b. Who will supervise the facility and how will that be funded ongoing:

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d. If any renovations or furnishings will be required to support the project, how will they be funded?

No.

Please describe how many students will be served each term through the funding of this project, and through what means:

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The new computers will serve all users and students in both the 116RE and 118RE Music Technology labs. These include all those listed above regarding the composition and performance tools, plus other students and faculty who may not be currently teaching or enrolled in a course that uses the labs but who continue to work there or present occasional workshops, performances, etc. In short, these new computers will benefit several hundred Brooklyn College students every semester.

How will projected outcomes be assessed?

For the SMARTboards, student outcomes would be assessed through class presentations, micro-teaching opportunities and collaborative projects with the SMARTBoard.

For the amplification system, composition/performance tools, and new iMac computers, student outcomes will be assessed as these tools are used in our courses. We will instruct students, test their understanding by means of quizzes and projects, and will solicit feedback regarding the success of our implementation of the equipment.

**Student Technology Fee Proposal #2015-34
Upgrade of Computer Lab 5102 Boylan Hall**

School: School of Visual, Media and Performing Arts
Department/Office: Art
Applicant Name: Kiel, Ronaldo
Additional Applicant(s):
Primary Contact for Proposal
Email Address: RKIEL@BROOKLYN.CUNY.EDU
Phone: 347 329 1220
Estimated total cost: \$ 20,000.00

Description of Proposed Project:

With the 2012 Student Technology Fee we initiated the upgrade of the Art Department's Computer Lab 5207 (5th floor Boylan). We received 16 new Mac Pro computers this semester (Fall 2014). But we are still using old displays, keyboards and mice. To complete the upgrade of the 5207 Lab we would like to request new displays, keyboards, mice, USB SuperDrives (or equivalent) and a new projector.

Equipment List: 16 Apple Thunderbolt displays, 16 Apple Keyboard with Numeric Keypad, 16 Apple Mice (or Logitech), 5 Apple USB SuperDrive (or equivalent), one projector

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

The use of very old Dell displays with the new MacPro computers in the 5207 Lab is causing crashes at start up and when the MacPros are idle and go into screen-saver mode. The upgrade of the displays as well as the other requested items will clearly improve the working conditions in the Lab.

The main objective of this project is to improve learning and the overall working conditions of the Lab.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

50

b. Who will supervise the facility and how will that be funded ongoing:

Full time College Lab Technician

c. What physical space will be used to host the facility, and who has authorized its use:

5207 Boylan

Art Department

d. If any renovations or furnishings will be required to support the project, how will they be funded?

No

Please describe how many students will be served each term through the funding of this project, and through what means:

234 Undergraduate students , 27 Graduate Art students, 15 PIMA students - Undergraduate, Graduate, PIMA, and Radio&Television courses are being taught in Lab 5207.

How will projected outcomes be assessed?

Student outcome will be assessed by the quality of the work produced during the semester. The Digital Art students exhibit every semester their work in the Art Department's Assessment Show in the art gallery (5th floor Boylan).

Government, Education, and Corporate Department

For Pricing Requests, Purchase Orders, and Customer Service:



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11/11/14	35103704	N/A	2QB	STANDARD
Qty Ord	Item Description	SKU# MFR#	Item Price	Amount
3	LG 14x EXTERNAL BLU-RAY WRITER USB 3.0/REG <i>This Item Has Free Shipping To The Continental USA.</i>	LGBE14NU40 (BE14NU40)	114.95	344.85
1	VIVITEK D950HD WUXGA 3000 LUMENS PROJECTOR/REG <i>This Item Has Free Shipping To The Continental USA.</i>	VID950HD (D950HD)	881.02	881.02
PLEASE NOTE: ----- Certain items may be enforced by vendor to sell at the vendor-imposed price posted at the time of order.				
Payment Type -			- Amount	
NO PAYMENT TYPE SELECTED				Sub-Total: 1,225.87
				Shipping: 0.00
				Total: 1,225.87

Federal ID#: 13-2768071

BNH_garce

Proposal 2101542627

Proposer: Anil Lilly

Thank you for your proposal dated 11/19/2014. The details we've provided below are based on the terms assigned to account 789045, BROOKLYN COLLEGE-CHIEF INFO OFFICER.

To access this proposal online, please search by referencing proposal number 2101542627.

Comments from Proposer:

Per R. Kiel

Part Number	Description	Total Quantity	Unit Price	Total Price
MC914LL/B	Apple Thunderbolt Display (27-inch)	16	949.00	15,184.00 USD
S3133LL/A	AppleCare Protection Plan for Apple Display - Auto-enroll	16	79.00	1,264.00 USD
MB110LL/B	Apple Keyboard with numeric keypad - US	16	49.00	784.00 USD
MB112LL/B	Apple Mouse	16	49.00	784.00 USD
MD564ZM/A	Apple USB SuperDrive	4	79.00	316.00 USD
			Subtotal	18,332.00 USD
			Estimated Tax	0.00 USD
			Total	18,332.00 USD

Please note that your order subtotal does not include Sales tax or rebates. Sales tax and rebates, if applicable, will be added when your order is processed.

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Student Technology Fee Proposal #2015-60
DIGITAL FILMMAKING INITIATIVE

School: School of Visual, Media and Performing Arts
Department/Office: Film
Applicant Name: Kim, Jung-Hun
Additional Applicant(s): Christman, Sarah
MacDonald, Rebecca

Primary Contact for Proposal

Email Address: JKIM@BROOKLYN.CUNY.EDU
Phone: 718-951-5664
Estimated total cost: \$ 53,554.00

Description of Proposed Project:

This proposal is to provide Film students access to digital filmmaking tools while maintaining our programs' relevance in today's digital world. With the proposed equipment, we will be able to serve our students with resources that will allow them to get training and support in the use of contemporary digital video technologies. This will help them complete course projects and give them a strong technical background, which will help them to successfully enter the work force.

Background: Film motion picture cameras are actually no longer being made. Kodak has declared bankruptcy and has stopped making most film stocks. The last film-processing lab in New York has just permanently shut down. Despite our nostalgia for the medium of film, it has unfortunately gone extinct. On the other hand, digital technology has made the cinematic art form much more democratic, allowing students from almost all income levels to afford to make films now. So while it's sad to see film go, digital cinema will continue to provide more opportunities for student filmmakers than ever.

Currently in the courses Film Production 1 & Cinematography workshop, our students are using 16mm film cameras that were built in the 1950's and 1960's. These cameras are actually no longer being made, and while they are beautifully-crafted pieces of machinery, they are hopelessly antiquated. Investing in 20 Canon T3i Digital SLR cameras and 10 Blackmagic Pocket digital Cinema cameras will help students to capture beautifully cinematic images that are virtually indistinguishable from film, at a tiny fraction of the cost.

The documentary concentration major was added to our BA program in 2010. In that time, we have updated the curriculum to contain a two-semester capstone sequence where students produce 10-15 minute documentary thesis films, equivalent to the thesis sequence for our production concentration majors. However, we do not have dedicated equipment necessary to support the production of the documentary thesis films, limiting our students' ability to tell their stories. Documentary filmmaking at an advanced level requires lightweight ergonomic High Definition cinema cameras with quality zoom lenses and lightweight tripods - unique from the equipment needs of other courses within the Film department. Investing in two C100 camera packages will offer students professional yet affordable tools to produce high quality films in a new and growing concentration within our program.

Estimated total cost: Total project cost \$53,554 (breakdown as follows)
?\$18,363 for 20x Canon Digital Rebel T3i camera package with 18-55mm & 75-300mm lenses
?\$20,494 for 10x Blackmagic Pocket Digital Cinema Camera packages with Panasonic 14-140mm lenses
?\$14,697 for 2x Canon C100 Mark II Camera packages with Canon 24-105mm lenses

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

The main objective of this project is to increase the teaching effectiveness of faculty in the film department. Also, It will directly impact the learning experience of all students who enroll in classes in the department because this equipment is for use in the classroom and also outside the classroom to work on projects.

Using digital cameras in the course Production 1, and throughout our program, will also greatly increase the quality of education we can provide to our students. Currently, because of the logistic difficulty of using film, a technology that virtually no one uses anymore, our students spend most of their time and effort in our production

classes wrestling with these 60 year old cameras which are constantly breaking, and costly to repair.

If we instead used digital cameras, students could spend less time struggling with machinery, and more time actually learning in greater depth the art and craft of cinematic storytelling. Also, in the past some students simply were not able to afford to shoot their films in our program. Now with digital technologies, they can.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

NA

b. Who will supervise the facility and how will that be funded ongoing:

Michael Irgang, Equipment Manager

c. What physical space will be used to host the facility, and who has authorized its use:

NA

d. If any renovations or furnishings will be required to support the project, how will they be funded?

Don't Need

Please describe how many students will be served each term through the funding of this project, and through what means:

All students (about 175 students per semester) in Intro to Film Production 1 (4-5 sections per semester), Cinematography Workshop (2 sections per semester), and Documentary production I & II.

How will projected outcomes be assessed?

Outcomes will be assessed differently in each class using criteria appropriate for the class. Also, the finished student films will be assessed during annual faculty screening in May, when they will be reviewed by the entire faculty. In the long run, higher quality of student films produced by the students will indicate improved coursework. These higher-quality productions will subsequently serve them well when they seek employment in the media industry.

Student Technology Fee Proposal #2015-40
STF Request for PIMA 2014

School: School of Visual, Media and Performing Arts
Department/Office: Performance and Interactive Media Arts
Applicant Name: Krauss, Briggan
Additional Applicant(s): Richardson, Helen
Primary Contact for Proposal
Email Address: bkobject@earthlink.net
Phone: 347 267-3721
Estimated total cost: \$ 10,412.00

Description of Proposed Project:

We are seeking to upgrade and add to our equipment in order to accommodate our ever increasing needs for technology in our department.

Computers: Our computers have not been upgraded in many years. Most of our computers are obsolete and need to be updated.

We are requesting one base model Mac Pro for multiple video projection and live sound and image processing. We also are asking for one base model iMac to be dedicated as our main classroom computer in 130C-NE. We are also asking for 3 base model Macbook Pros for portable computing needs of our students.

Video: We are asking for four BenQ Projectors which are basic , relatively inexpensive workhorse video projectors to accommodate our increasing demand for video projection in performance as well as to upgrade some of our older projectors which are four or more years old.

Bell & Howell DNV6HD Rogue Infrared Night Vision Video Camera Camcorder is an inexpensive high quality Infrared camera which would be very useful for visual computer tracking of performers and objects in live performance.

Audio: We are seeking to upgrade our audio interface for multi channel sound output for projects requiring more than two sound sources such as 5.1 surround sound or other custom speaker arrangements from a single source. The MOTU UltraLite-mk3 Hybrid is a great solution to this need.

Lighting: We are currently in great need of some basic lighting for our performance projects. For years we have been making do with hardware store clip lights and whatever else students can find or provide. We are requesting two Chauvet four bar portable LED stage lighting systems and an Obey 40 DMX lighting controller to provide versatile, practical and portable lighting solutions for our work.

Controllers: We are also requesting two Leap Motion controllers which are revolutionary yet inexpensive controllers for computer interaction for audio and video production and manipulation.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

The Performance and Interactive Media Arts MFA program at Brooklyn College is unique among colleges in the United States offering cutting edge approaches to performance, collaboration, interdisciplinary arts, and interactive media . The educational experience provided by our distinguished and dedicated faculty is second to none. It is our goal to provide students with the experience of learning and working with as much cutting-edge technology as possible.

The students in our program will benefit firstly in providing relevant real-world experience working with up to date professional equipment. Another benefit is to simply have a variety of technology solutions and options on hand and ready for students to utilize in their work which fosters creative problem solving as well as simply making the best, most efficient use of precious class and work time.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

- b. Who will supervise the facility and how will that be funded ongoing:**
- c. What physical space will be used to host the facility, and who has authorized its use:**
- d. If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

All of the items on our request will be available and a benefit to each and every of the students in the PIMA program through providing greater access to vital and versatile cutting-edge technology which is of foundational importance to working with interactive multimedia.

How will projected outcomes be assessed?

At the beginning of every year we take an inventory and assess what technology has been used the most, what our needs will be in the future and what technology we need to replace or upgrade.

2014 STF Proposal Items for PIMA MFA Program

Description	Units	Cost Per Unit	Amount
Mac Pro (base model) for lab and local performances	1	\$ 2,999.00	\$ 2,999.00
iMac (base model) for lab AV setup	1	1,099.00 \$	1,099.00
Macbook Pro (base model) for general use	3	1,099.00 \$	3,297.00
BenQ MS524 SVGA 3200 Lumens Projector with HDMI (versatile projector for general use) http://www.amazon.com/BenQ-MS524-Lumens-Ready-Projector/dp/B00MBE21FU/ref=sr_1_1?s=pc&ie=UTF8&qid=1416597812&sr=1-1&keywords=video+projector	4	309.99	\$1,239.96
Leap Motion Controller http://www.amazon.com/Leap-Motion-Controller-Packaging-Software/dp/B00HVYBWQO/ref=sr_1_1?s=electronics&ie=UTF8&qid=1416597909&sr=1-1&keywords=leap+motion	2	79.00 \$	158.00
Bell & Howell DNV6HD Rogue Infrared Night Vision 1080p HD Video Camera Camcorder http://www.amazon.com/Howell-DNV6HD-Infrared-Vision-Camcorder/dp/B00LWEHAYM/ref=sr_1_105?s=photo&ie=UTF8&qid=1416598344&sr=1-105&keywords=infrared+camera	1	129.95 \$	129.95
MOTU UltraLite-mk3 Hybrid (multi channel output and input for computer audio) http://www.sweetwater.com/store/detail/UltraLite3Hy	1	549.00 \$	549.00
Four bar portable stage lighting system. http://www.stagelightingstore.com/Chauvet-4-Bar?sc=25&category=342665	2	399.99 \$	799.98
Obey 40 DMX lighting controller http://www.stagelightingstore.com/Chauvet-Obey-40	1	119.99 \$	139.99
		Invoice Subtotal	\$ 10,411.88
		Tax Rate	0.00%
		Sales Tax	-
		TOTAL	\$ 10,411.88

Student Technology Fee Proposal #2015-43
Replacement of iMac computers at audio/radio editing lab

School: School of Visual, Media and Performing Arts
Department/Office: Television and Radio
Applicant Name: Macias, Miguel
Additional Applicant(s): Maclelland, Stuart
Primary Contact for Proposal
Email Address: mmacias@brooklyn.cuny.edu
Phone: 718 951 4515
Estimated total cost: \$ 19,500.00

Description of Proposed Project:

Replacement of 15 computers at a student computer lab (radio and sound post production lab) located in room 302 Whitehead Hall.

The computers we are requesting to replace are:

- 3 unlabeled iMac8,1 (Early 2008).
- The following 11 BRO # iMacs:
BRO# 0046962
BRO# 0047929
BRO# 0052538
BRO# 0052540
BRO# 0052732
BRO# 0052740
BRO# 0052741
BRO# 0052748
BRO# 0052758
BRO# 0052995
BRO# 0053003
- The following Dell PC (we would like to replace it with an iMac):
BRO# 0053455

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

This computer lab hosts three to five courses per semester. The aging computers are barely able to run the specialized software we require: Adobe Audition and Pro Tools. We also cannot upgrade Pro Tools to its latest version due to the computers' limitations.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

45

b. Who will supervise the facility and how will that be funded ongoing:

Professor Miguel Macias.

c. What physical space will be used to host the facility, and who has authorized its use:

302 Whitehead Hall.

This computer lab already exists.

Any student in the Television and Radio department has access to this lab.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

No.

Please describe how many students will be served each term through the funding of this project, and through what means:

Approximately 80 to 100 students per week and semester.

How will projected outcomes be assessed?

Replacing aging, almost dysfunctional computers is in itself the goal and outcome of this request. We have asked ITS to replace this computers with new models twice in the past six months, but we have been notified that our upgrades have been placed in a wait list. We don't have a sense of how long we will have to wait for these units to be replaced. Meanwhile, students are dealing with the predictable issues anyone would encounter when running CPU demanding audio editing software on an older machine.

Student Technology Fee Proposal #2015-44

Document Cameras and AC Chargers

School: School of Education
Department/Office: Education, Early Childhood and Art Education
Applicant Name: Tucker, Jorge
Additional Applicant(s): Louis, Linda
Primary Contact for Proposal
Email Address: JTUCKER@BROOKLYN.CUNY.EDU
Phone: ext. 3886
Estimated total cost: \$ 3,500.00

Description of Proposed Project:

Document cameras are needed for presentations that do not involve software. In public school art classes teachers used different models to teach children which include clay and sometimes sheets of paper. With sizes in public school increasing it is tough for our student teachers to have their students gather around a desk to view these demonstrations. Since all classes are usually equipped with a projector and computer a document camera would allow the teacher to connect themselves to the computer to show the presentation on a big screen for all to see. Here are two possible examples of document cameras, with the lady bug versions being smaller and easy to transport to the public schools and back to campus:

http://www.amazon.com/Elmo-MO-1-Visual-Presenter-White/dp/B007T1YO64/ref=sr_1_3?ie=UTF8&qid=1416431947&sr=8-3&keywords=document+cameras

http://www.amazon.com/Lumens-DC125-Ladibug-Lightweight-Documents/dp/B00AYK6XMA/ref=sr_1_13?ie=UTF8&qid=1416431947&sr=8-13&keywords=document+cameras

AC chargers for flip cameras to the student tech proposal. The cameras that we currently have do not charge easily through the USB port but are a snap using the ac charger. (http://www.amazon.com/Unlimited-Cellular-Travel-Charger-Camcorder/dp/B005GTAH4O/ref=sr_1_3/181-8044763-1908721?ie=UTF8&qid=1414088816&sr=8-3&keywords=charger+for+flip+video)

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

ECAE students will be able to borrow these document cameras just like they borrow our flip cameras to use at their field trainings site. The equipment will also be available to faculty to use in class room settings. This will present clearer views when working with illustrations or manipulative that do not involved computer software.

If funding is requested for a lab, other public access technology facility, of other physical facility:

- a. How many hours per week the lab will be open:
- b. Who will supervise the facility and how will that be funded ongoing:
- c. What physical space will be used to host the facility, and who has authorized its use:
- d. If any renovations or furnishings will be required to support the project, how will they be funded?

Please describe how many students will be served each term through the funding of this project, and through what means:

All students within the ECAE department will have access to this equipment on a sign out basis just like digital

cameras received in previous STF grants. Even though this is geared more towards the Art students all ECAE students be able to make use of the equipment.

How will projected outcomes be assessed?

Equipment will make it easier for students when setting up their video presentations for EdTPA.

Student Technology Fee Proposal #2015-45
Swivl Robotic Platform for Video

School: School of Education
Department/Office: Education
Applicant Name: Tucker, Jorge
Additional Applicant(s): Bedford, April
Primary Contact for Proposal
Email Address: JTUCKER@BROOKLYN.CUNY.EDU
Phone: 3886
Estimated total cost: \$ 4,000.00

Description of Proposed Project:

Passing EdTPA requirements is a must for students in NYS to be licensed and certified to teach within the state. One of the requirements of the EdTPA is a video component where students must film themselves in school settings with actual students. One of the issues we have had with this is that students borrow our equipment but must stand put in a certain spot while being recorded unless they are able to have a friend play cameraman for them. With some lessons being able to move around and interact with the students or using different manipulatives is very vital. The Swivl technology is a new technology that helps in having the camera itself be able to adjust to the lecture by following the instructor around with the use of a remote. We are requesting 10 of these Swivl's. They will be split amongst the 4 departments within the SoE with each receiving 2 apiece while I, Jorge Tucker will hold the last 2 and incorporate them with faculty in their daily classes.

Here is some info on the swivl.

Overview

Swivl is how presentations should be delivered. Ideal for delivery and capture of lectures, instructional videos and even company presentations. Swivl's robot, app and cloud hosting service use your existing technology (smartphone, tablet or DSLR camera) to deliver content and capture engaging multimedia videos anywhere, anytime.

Uses

Professionals, schools and businesses use Swivl to share knowledge and skills, and collaborate. Record how-to videos, capture lectures, flip classrooms, build libraries of learning content, reach distance learners and much more. You can also deliver sales presentations to a wider audience, accelerate on-boarding, train employees and improve team collaboration across distances.

Robot

The Swivl robot turns your tablet or smartphone into an automated video solution that follows you. You can capture yourself while delivering presentations, even as you move around. It has a wireless microphone to enhance audio and remote controls.

Apps

The Swivl has a wide variety of compatible mobile apps. The Swivl Capture app is for presentation delivery, or just video capture. It includes features for managing the settings of your Swivl and more. Check out our other compatible apps for DSLR camera control, professional development and more.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

students will be able to set up the video recording portion of their EdTPA requirements on their own without having to wait on free time from others to lay cameraman. Also with the technology set to follow the student teachers around it will open up for students to have more interactive lesson plans and not be confined to a certain area when using a stand alone tri-pod.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. **How many hours per week the lab will be open:**

- b. Who will supervise the facility and how will that be funded ongoing:**
- c. What physical space will be used to host the facility, and who has authorized its use:**
- d. If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

all students within the SoE will be able to borrow and use the Swivl. They would be geared more towards our student teachers and those students who will be registered for EdTPA and licensing.

How will projected outcomes be assessed?

EdTPA requirements must be met for students to be licensed to teach within NY state. If this technology can help students with the digital recording aspect of the requirements it would be very beneficial. The more students that pass requirements the better that it will look on the SoE as a whole in general.

Student Technology Fee Proposal #2015-42
Speech, Language, Hearing Lab Technology

School: School of Humanities and Social Sciences
Department/Office: Speech Communication Arts and Sciences
Applicant Name: Bergen, Michael
Additional Applicant(s): Emmer, Michele
Geller, Elaine

Primary Contact for Proposal

Email Address: MBERGEN@BROOKLYN.CUNY.EDU
Phone: 718 951-5186

Estimated total cost: \$ 43,977.00
This project was approved in the prior STF year pending funding availability and was not yet funded

Description of Proposed Project:

undergraduate and graduate curriculum in both speech-language pathology and audiology. The new technology will facilitate student participation in clinical laboratory and research activities. The requested items will allow students to obtain direct experience with new equipment, will help facilitate observation of clinical sessions, and will allow the program to better provide for undergraduate and graduate students to engage in activities for laboratory/research assignments and to fulfill learner outcomes and departmental assessment standards. Undergraduate and graduate students regularly utilize the Speech Language Hearing Center's facilities by observation of and/or direct experience in clinical sessions. Students also make use of the existing technology in the Center via laboratory exercises and research assignments. Select existing pieces of equipment integral to clinical and educational function have become outdated, are of limited functionality, and in need of replacement. This request for an audiometer, an EMG, a pulse oximeter, sound-level meters, tablet applications, Manikin with coupler, clinical assessment tools, hard drive storage, video camera and recording equipment will help to expand the experiences and access to students of our programs

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

The project will offer students a comprehensive, state-of-the-art clinical training experience, consistent with the academic programs' adherence to the requisite knowledge and skills mandated by the Council on Academic Accreditation of the American Speech-Language Hearing Association. Furthermore, it will enable graduates of the clinical training program to continue to be leaders in the field of communication sciences and disorders. With the requested technology, students will be better equipped to document, record and analyze clinical data, and will therefore be better able to report on the sessions. The technology will become an additional resource available to students, which can encourage research and other scholarly activities.

This project will offer clinical training opportunities for undergraduate and graduate students enrolled in speech language pathology and audiology as follows:

-Provide its students with a superior clinical education in speech communication sciences and disorders by offering students the opportunity to work with a wider and more current range of clinical and research tools via tablet applications. Students will also be able to access a range of recorded classroom sessions necessary to illustrate the principles and concepts to which they are exposed. Additionally, items in this proposal will expose students to the latest technology in audiological diagnostics, voice assessment and will help to facilitate clinical research and evidence-based practice

-Maintain and enhance the learning environment, and strengthen the link between classroom and clinical instruction. For example, this project will provide opportunities for direct application of state-of-the-art computer-based technology in service delivery, and the inclusion of evidence-based practice and applied clinical research.

-Train future speech language pathologists and audiologists whose superior education will provide the highest quality of services within the borough of Brooklyn.

Student learner outcomes will be measured by:

-the number and range of clinical sessions in which students will successfully utilize advanced technological applications;

-the extent to which students will be able to self-evaluate the usefulness of technology within the clinical session;

-progress in students' academic and clinical training in keeping with models of formative and summative

assessment of instruction as required by academic accrediting agencies, such as the Committee on Academic Accreditation of the American Speech Language Hearing Association.
-application of evidence-based practice in the evaluation of diagnostic and therapy outcomes.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

50

b. Who will supervise the facility and how will that be funded ongoing:

Clinical instruction within the center will continue to be supervised by existing clinical faculty, specifically by the Clinic Director, Assistant Clinic Director and clinical supervisors. There will be no additional costs incurred beyond our current instructional budget in order to continue such supervision

c. What physical space will be used to host the facility, and who has authorized its use:

The Speech Language Hearing Center serves as the primary lab for equipment use. The applicants for this proposal have authority to identify the Center as the host facility.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

No renovations will be required.

Please describe how many students will be served each term through the funding of this project, and through what means:

The technology provided in this project will benefit approximately 300 students per semester. Students who will be served by this proposal will be registered in undergraduate and graduate courses (Speech 1179, 2481, 2482, 7211, 7327, 7313, 7331, 7333, 7391, 7392, 7441, 7691). Additionally, students engaged in clinical laboratory and research activities beyond the classroom will be able to function more efficiently.

How will projected outcomes be assessed?

Student learner outcomes will be measured by:

- the number and range of clinical sessions in which students will successfully utilize advanced technological applications;
- the extent to which students will be able to self-evaluate the usefulness of technology within the clinical session;
- progress in students' academic and clinical training in keeping with models of formative and summative assessment of instruction as required by academic accrediting agencies, such as the Committee on Academic Accreditation of the American Speech Language Hearing Association.
- application of evidence-based practice in the evaluation of diagnostic and therapy outcomes.

Student Technology Fee Proposal Form (revised 10/2013)

Request may not exceed 3 single spaced pages of 11 point type.

Longer requests or smaller point type will not be considered.

Please read the accompanying guidelines and instructions carefully before making your proposal.

Submit the completed form electronically to STFREQUST@brooklyn.cuny.edu

Contact Anil Lilly of ITS with any questions – x5861

Deadline: November 27, 2013. Late submissions will not be considered.

1. Department/Office Name: **Department of Speech Communication Arts and Sciences**
2. Applicant Name(s): **Michele Emmer, Gail Gurland and Michael Bergen**
3. Primary Contact for Request(s): **Michael Bergen**
4. Request 1 of 1

5. Area head approval: _____
signature

NOTE NEW PROCEDURE! All proposals MUST be approved and submitted by the appropriate executive area head:

Student proposals by VP of Student Affairs Morales. Faculty proposals by the appropriate Dean of School.

Administrative proposals by AVP Mark Gold. Library proposals by the Chief Librarian Stephanie Walker

6. Description of proposed expenditure/project:

This proposal is for equipment which will enhance clinical, classroom and laboratory education in the undergraduate and graduate curriculum in both speech-language pathology and audiology. The new technology will facilitate student participation in clinical laboratory and research activities. The requested items will allow students to obtain direct experience with new equipment, will help facilitate observation of clinical sessions, and will allow the program to better provide for undergraduate and graduate students to engage in activities for laboratory/research assignments and to fulfill learner outcomes and departmental assessment standards.

Undergraduate and graduate students regularly utilize the Speech Language Hearing Center's facilities by observation of and/or direct experience in clinical sessions. Students also make use of the existing technology in the Center via laboratory exercises and research assignments. Select existing pieces of equipment integral to clinical and educational function have become outdated, are of limited functionality, and in need of replacement. This request for an audiometer, an EMG, a pulse oximeter, sound-level meters, tablet applications, Manikin with coupler, clinical assessment tools, hard drive storage, video camera and recording equipment will help to expand the experiences and access to students of our programs.

7. Estimated total cost: (ITS can assist with general technology cost estimates): **\$42,977.39**

GSI Audiostar audiometer	\$10,500.00
Prometheus Group Pathway MR-15 Surface EMG Biofeedback Machine # 030042	\$1,080.00
Pathway Electrodes(two pkg x 100) Item#: 022063 (\$120x2)	\$240.00
Nonin GO2 pulse oximeter	\$120.00
Extech 407730 40-to-130-Decibel Digital Sound Level Meter (2x\$74)	\$148.00
Parts Express Mini Digital SLM (2x\$30)	\$60.00
KEMAR Head and Torso with mic and coupler package	\$18,500.00
Canon/Model: VIXIA HF M52 Full HD Camcorder with Basic Accessories Kit	\$975.95
Sony Digital Voice Recorder	\$60.00
Tripod Oben Model#: AC-1300	\$89.95
Four iPad 2 with cases – 16GB wifi	\$1600.00
Four iPad 2 cases	\$160.00

Two iPad mini 16GB wifi	\$600.00
Two iPad mini cases	\$70.00
Ipod nano 16GB	\$149.00
Griffin clip for Ipod Nano	\$25.00
External 1TB hard drives (6 x \$75)	\$450.00
Clinic apps for ipad use (Apple AppStore Card/ see attached apps)	\$499.49
Maico MA-39 Audiometer 2x\$1400	\$2800.00
Maico Easy Tymp	\$3550.00
LACE HE (Listening and Communication Enhancement)	\$100.00
NOAH hearing aid programmer	\$900.00
AAXA P4 P4X Pico DLP Projector, Pocket Size	\$300.00

8. Are any of the items in your proposal available from only one source? If so, please attach a sole source attestation letter from the vendor(s) and also one from your department/office, as required by Purchasing.
Yes. A sole source letter is attached.
9. How many students will be served each term through the funding of this project?
The technology provided in this project will benefit approximately 300 students per semester. Students who will be served by this proposal will be registered in undergraduate and graduate courses (Speech 1179, 2481, 2482, 7211, 7327, 7313, 7331, 7333, 7391, 7392, 7441, 7691). Additionally, students engaged in clinical laboratory and research activities beyond the classroom will be able to function more efficiently.
10. If funding is requested for a lab, other public access technology facility, or other physical facility:
- How many hours per week the lab will be open?
The center is open Monday-Thursday, 8:30 AM-8:00 PM; Friday, 8:30 AM-4:00 PM. There will be no need for additional coverage to allow students to use the requested technology.
 - Who will supervise the facility and how will that be funded ongoing? (STF will not fund staffing)
Clinical instruction within the center will continue to be supervised by existing clinical faculty, specifically by the Clinic Director, Assistant Clinic Director and clinical supervisors. There will be no additional costs incurred beyond our current instructional budget in order to continue such supervision
 - What space will be used to host the facility and who has authorized its use?
The Speech Language Hearing Center serves as the primary lab for equipment use. The applicants for this proposal have authority to identify the Center as the host facility.
 - Will any renovations or furnishings be required to support the technology requested? If so, how will these be funded? (STF will not fund renovations or most furnishings)
No renovations will be required.
11. What are the objectives of this project? How will student outcomes be assessed?
This project will offer clinical training opportunities for undergraduate and graduate students enrolled in speech language pathology and audiology as follows:
- Provide its students with a superior clinical education in speech communication sciences and disorders by offering students the opportunity to work with a wider and more current range of clinical and research tools via tablet applications. Students will also be able to access a range of recorded classroom sessions necessary to illustrate the principles and concepts to which they are exposed. Additionally, items in this proposal will expose students to the latest technology in audiological diagnostics, voice assessment and will help to facilitate clinical research and evidence-based practice**

- **Maintain and enhance the learning environment, and strengthen the link between classroom and clinical instruction. For example, this project will provide opportunities for direct application of state-of-the-art computer-based technology in service delivery, and the inclusion of evidence-based practice and applied clinical research.**
- **Train future speech language pathologists and audiologists whose superior education will provide the highest quality of services within the borough of Brooklyn.**
Student learner outcomes will be measured by:
- **the number and range of clinical sessions in which students will successfully utilize advanced technological applications;**
- **the extent to which students will be able to self-evaluate the usefulness of technology within the clinical session;**
- **progress in students' academic and clinical training in keeping with models of formative and summative assessment of instruction as required by academic accrediting agencies, such as the Committee on Academic Accreditation of the American Speech Language Hearing Association.**
- **application of evidence-based practice in the evaluation of diagnostic and therapy outcomes.**

12. How will this request have a direct impact on student learning or student life?

The project will offer students a comprehensive, state-of-the-art clinical training experience, consistent with the academic programs' adherence to the requisite knowledge and skills mandated by the Council on Academic Accreditation of the American Speech-Language Hearing Association. Furthermore, it will enable graduates of the clinical training program to continue to be leaders in the field of communication sciences and disorders. With the requested technology, students will be better equipped to document, record and analyze clinical data, and will therefore be better able to report on the sessions. The technology will become an additional resource available to students, which can encourage research and other scholarly activities.

IMPORTANT GUIDELINES AND INSTRUCTIONS

Examples if acceptable uses of STF funds:

- Acquiring or upgrading student accessible computers
- Implementing or upgrading student-serving computer labs
- Acquiring or developing new tools to improve student services
- Acquiring equipment or software to support faculty development of new or improved courseware
- Acquiring or upgrading instructional software
- Upgrading instructional spaces to support technology-assisted learning
- Computer furniture and network/phone cabling
- Acquiring technology tools to support college-sponsored student activities
- Requests for multiple years of funding will be entertained, but are less likely to be approved.

Examples of unacceptable uses of STF funds:

- Supplies, other than an initial small starter supply for a new piece of equipment
- Construction or other infrastructure needs, such as HVAC, electrical work, painting, window shades etc.
- Salaries or stipends - neither P/T nor F/T - for lab-tech, lab-support, or other implementation or support needs.
- Equipment or software for faculty research or private faculty use
- Requests to utilize STF funds to replace or subsidize standard budgeted expenditures for college operations.

Funding and Procurement:

- Proposals approved for funding still need to go through the standard CUNY procurement process, which can be time consuming and require adherence to many arcane regulations. This requires your cooperation now and during the procurement process in the following year. Approved proposals that cannot be successfully procured by January of the spending year are subject to forfeiture and the funds allocated to other queued proposals.
- The STF committee reviews each proposal in early Spring and assigns one of the following determinations to each: Approved in whole or in part, Declined, Held in queue for possible funding later in the year. The decision will be communicated in writing to each submitter, typically within one month after the STF decisions are made.
- Proposals submitted now will be executed and funded in the next fiscal year. Those funds do not typically start arriving until Fall of that year, and are collected throughout the year (Fall and Spring). While every effort will be made to initiate purchases as quickly as possible, most purchases will not be completed in time for the Fall term, and some may have to be deferred to Spring. Please keep this in mind when planning your Fall 2014 classes.
- CUNY requires that STF funds be expended in the year they are collected. Therefore if ITS or College Purchasing determines that a purchase is not practically attainable in the necessary timeframes, the allocations may be rescinded and the funds reallocated to other queued projects.
- Proposals are approved only for the items requested. Any subsequent cost savings return to the general STF fund for reallocation. Funding allocations are based on the proposal estimate and may not increase to cover any subsequent price increases.

Preparing Your Proposal:

- Almost all activity on campus is somehow ultimately related to students. However, only proposals that provide fairly direct and immediate benefit to students will be considered.
- Proposals previously submitted, but not funded for any reason, do not automatically get considered in subsequent years. A new proposal must be submitted.
- Instructional software requests must be approved by the college's Software Coordination Committee, which verifies technical compatibility, and ensures that true campus-wide implementation costs are considered. The Software Request Form can be downloaded from: <http://www.brooklyn.cuny.edu/bctf/stfp/>
- If a proposal requires a new space on campus, it will not be considered unless the submitter FIRST obtains an appropriate location, approved by the administration for this use.
- STF allocations are based on the proposal's good-faith estimates, which should preferably be based on actual price quotes where possible.
- Proposals should include all related needs in one application. Do not submit multiple applications for smaller amounts of equipment that will serve the same purpose.
- Please be sure to include copies of any quotations, estimates, suggested vendors, and sole vendor letters that may be required to facilitate the procurement, if approved. Quotes must list the same exactly matching items only, with no additional items. All quotes must be tax exempt. NYS and CUNY procurement rules require the following:
 - If your order is under \$5,000, three vendor quotes are needed.
 - If your order is over \$5,000, five vendor quotes are needed.
 - Please make sure that all quotes include shipping to ITS, Library, 4th Flr, 2900 Bedford Avenue, Brooklyn, NY 11210. Large items or skids must be delivered with lift gate service and inside delivery. Make sure that your vendor quotes include these services in their pricing.
 - If your request includes items that can only be purchased through one vendor, sole source attestation letters from the vendor and your department/office are required. The department/office letter should include the following points on official department letterhead:
 - Provide background information.
 - Identify need for the purchase.
 - Demonstrate why competitive solicitation is not warranted.
 - How did you determine sole source was the best method?
 - Clarify how reasonable price and terms were determined.
 - Justify - why this vendor?
 - What happens if the College doesn't make this purchase (as a sole source)?

Student Technology Fee Proposal #2015-46
Development of Hands On Training for Contemporary Practices in AAC Systems for Undergraduate and Graduate Curriculums

School: School of Humanities and Social Sciences
Department/Office: Speech Communication Arts and Sciences
Applicant Name: Fuse, Akiko
Additional Applicant(s):
Primary Contact for Proposal
Email Address: AFUSE@BROOKLYN.CUNY.EDU
Phone: 917-575-7809
Estimated total cost: \$ 30,690.00

Description of Proposed Project:

A major component of a speech-language pathologist's (SLP) scope of practice is to provide augmentative and alternative communication (AAC) services for clients incapable of communicating through oral speech alone. AAC encompasses all possible forms and modalities of communication other than oral speech that will enhance a client's ability to express their wants, needs, feelings, and thoughts (American Speech- Language Hearing Association, 2002).

Traditional AAC programming promotes the use of high tech devices that require highly specialized, complex training for the SLP as well as lengthy and involved programming and training for each client and their caregivers. Furthermore, traditional AAC devices are often quite expensive and not always affordable for clients. The significant financial cost and complex training and programming make traditional AAC devices difficult and burdensome for SLPs to incorporate into their practice and are difficult for the client and caregiver to afford and learn how to use effectively.

However, since the invention and introduction of the iPad and iPad Mini, these devices have become the high tech AAC devices of choice in the SLP field. iPads and iPad Minis are simpler to incorporate in an SLP's practice because they are easier to program, resulting in less complex training for clients and caregivers, and the costs are significantly less than traditional high tech AAC devices. In addition to these benefits, iPads integrate with other consumer products and are familiar to the general public, which eases the difficulty of communicating with people other than specific caregivers. Over the past several years many free or inexpensive applications for the iPad have been developed specifically for clients with communication disorders. Providing SLP students with proper iPad training for working with individuals with communication disorders will vastly enhance the quality of life for clients.

Hands-on experiences with the iPads and applications will be incorporated into the curriculum of the following undergraduate classes, SPEC 3381 Nature of Speech and Language Disorders and SPEC 4383 Treatment of Speech and Language Disorders. Training on the iPads will also be included in graduate courses such as SPEC 7551, Professional Practice in Educational Settings. Select AAC applications will be purchased and downloaded to devices. AAC workshops using the iPads can also be developed for both undergraduate and graduate students to acquire knowledge and skills for incorporating AAC devices into their practice to assist their future clients. Graduate clinicians will be expected to utilize the skills acquired in the classroom while working with clients in the Diana Rogovin Davidow Speech, Language and Hearing Clinic at Brooklyn College.

Hands on training with the iPads and iPad Minis will greatly expand the opportunities for both undergraduate and graduate students to apply AAC theories and develop the appropriate knowledge and skills for effectively utilizing iPads and various applications with communicatively impaired individuals. Having both the knowledge, skills, and hands on experiences to effectively utilize iPads for AAC will better equip Brooklyn College students for their off campus clinical practicums and make them more desirable job candidates in their future work settings and career endeavors.

Budget

15 iPads (\$5635) and 15 iPads minis (\$3535) including cases with keyboards for 30 iPads (\$3000) will be requested. A tablet charging cart which provides charging and secure storage for 30 tablets (\$670 Luxor Furniture - LLTM30-B-RFID - Tablet Charging Cart (30 tablets) by Global Industrial). AAC software to be purchased through the App store:
- My Choice Board \$10x30= \$300 *150

- Look2Learn \$15x30= \$450 *225
- Voice4U \$60x30=\$1800 *900
- MyTalkTools Mobile \$100x30= \$3000 *1500
- iCommunicate for ipad \$50x30= \$1500 *750
- iPrompts \$50x30= \$1500
- TapSpeak Choice \$150x30= \$4500 *2550
- TouchChat HD \$150x30= \$4500 *2250
 - Predictable \$160x30= \$4800 *2400
 - Proloquo2Go \$190x30= \$5700 *3300
- AutisMate \$150x30= \$4500 *2250
- Time Timer \$3x30= \$90 *75

*corresponding volume purchasing price through Apple Volume Purchasing Program

Grand totals:

44,130 without volume pricing discount

30,690 with volume pricing discount

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

Hands on training with the iPads and iPad Minis will enable both undergraduate and graduate students to apply AAC theories that are currently just discussed in class. Being able to actively learn these theories and ideas with a hands on component will help develop students' critical thinking and analytical skills as well as provide them opportunities to apply their knowledge to select appropriate AAC support for individual clients with varying severity and disorders under the guidance of trained faculty. The opportunity will also prepare them for working in their careers in the field of speech-language pathology where iPads have become an increasingly common clinical tool. Not only will this hands on training better prepare them, our students will also be more desirable job candidates as a result.

Objective 1: Students will be able to choose appropriate AAC software to improve communication skills using iPads/iPad Minis for their clients.

Objective 2: Students will be better able to provide necessary communication modalities (voice output, picture symbols, orthographical symbols, photographs) to enhance clients' communication abilities further fulfilling the American Speech-Language Hearing Association's communication modalities requirement.

Objective 3: Students will be able to introduce AAC to clients who are in need of assistive technology and train the clients and their family members/caregivers to effectively use iPads/iPad Minis.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

N/A

b. Who will supervise the facility and how will that be funded ongoing:

N/A

c. What physical space will be used to host the facility, and who has authorized its use:

N/A

d. If any renovations or furnishings will be required to support the project, how will they be funded?

N/A

Please describe how many students will be served each term through the funding of this project, and through what means:

The undergraduate courses, SPEC 3381 Nature of Speech and Language Disorders and SPEC 4383 Treatment of Speech and Language Disorders will be offered in the fall, spring and summer. The graduate course, SPEC 7551, Professional Practice in Educational Settings will be offered in the spring and summer. Enrollment for each course is approximately 30 students per semester. The proposed AAC workshop can be offered for both beginner and intermediate levels of AAC users every semester and approximately 30-40 students are anticipated for each

workshop. Besides the classroom, iPads and iPad Minis will be used in the Diana Rogovin Davidow Speech Language Hearing Center as part of the graduate clinical practicum. Clinical practicum is a required course and there are approximately 70 students (graduate student clinicians and student observers who assist graduate student clinicians) who have direct contact with clients. A total number of students who will be using the equipment would be approximately 240 students per semester.

How will projected outcomes be assessed?

Pre-and post-surveys will be distributed to assess students' self-perceived knowledge and skills for both undergraduate and graduate students. The surveys will be distributed to students in class, workshops, and clinical practicum. The survey questions will include development of knowledge and skills, frequency of AAC implementation and application of AAC techniques.

Apple Inc. Education Price Quote

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email: hpatrick@apple.com

Apple Quote: 2201915663
Quote Date: 13-Nov-2014
Quote Valid Until: 13-Dec-2014

Quote Comments:
Reference contract # CCN4901 on the PO for CUNY

Row #	Part Number	Details & Comments	Qty	Unit List Price	Extended List Price
1	BKWG2LL/B	iPad Air Wi-Fi 16GB – Space Grey (10-pack) iPad Air Wi-Fi 16GB – Space Grey (10-pack) Part Number: ME894LL/B Quantity: 10	1	3,740.00	3,740.00
2	MD785LL/B	iPad Air Wi-Fi 16GB – Space Grey	5	379.00	1,895.00
Edu List Price Total					5,635.00
– eWaste Fee / Recycling Fee					0.00
–					
–					
Extended Total Price*					5,635.00

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Document rev 10.4.5

Date of last revision – April 16th, 2014

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Apple Quote: 2201915308
Quote Date: 13-Nov-2014
Quote Valid Until: 13-Dec-2014

Quote Comments:
Reference contract # CCN4901 on the PO for CUNY

Row #	Part Number	Details & Comments	Qty	Unit List Price	Extended List Price
1	BJ794LL/A	iPad mini Wi-Fi 16GB – Space Gray (10-pack) iPad mini Wi-Fi 16GB – Space Gray (10-pack) Part Number: MF433LL/A Quantity: 10	1	2,340.00	2,340.00
2	MF432LL/A	iPad mini Wi-Fi 16GB – Space Gray	5	239.00	1,195.00
Edu List Price Total					3,535.00
– eWaste Fee / Recycling Fee					0.00
–					
–					
Extended Total Price*					3,535.00

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email: hpatrick@apple.com

Apple Quote: 2201933189
Quote Date: 20-Nov-2014
Quote Valid Until: 20-Dec-2014

Quote Comments:
Reference contract # CCN4901 on the PO for CUNY

Row #	Part Number	Details & Comments	Qty	Unit List Price	Extended List Price
1	HE213VC/A	Logitech Ultrathin Keyboard Folio for iPad mini - Black	15	99.95	1,499.25
Edu List Price Total					1,499.25
- eWaste Fee / Recycling Fee					0.00
-					
-					
Extended Total Price*					1,499.25

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 email: hpatrick@apple.com

Apple Quote: 2201933552
 Quote Date: 20-Nov-2014
 Quote Valid Until: 20-Dec-2014

Quote Comments:
 Reference contract # CCN4901 on the PO for CUNY

Row #	Part Number	Details & Comments	Qty	Unit List Price	Extended List Price
1	HFLF2VC/A	Logitech Ultrathin Keyboard Cover for iPad Air - Space Grey	15	99.95	1,499.25
Edu List Price Total					1,499.25
- eWaste Fee / Recycling Fee					0.00
-					
-					
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Student Technology Fee Proposal #2015-49

Journalism Lab Computers

School: School of Humanities and Social Sciences
Department/Office: English
Applicant Name: Moses, Paul
Additional Applicant(s): Mancini, Anthony
Howell, Ronald

Primary Contact for Proposal

Email Address: PMOSES@BROOKLYN.CUNY.EDU
Phone: 718-938-1410
Estimated total cost: \$ 55,000.00

Description of Proposed Project:

We request 24 new iMAC computers with 27-inch screens to replace the existing computers in the Journalism Lab, Room 132 NE. The cost is \$2,014 each. The existing 24 iMAC computers in the room, installed in 2008, do not have the capacity to run the latest edition of Final Cut Pro, the media industry's standard software for video editing.

Prof. Howell has consulted with Young Cheong of the TV-Radio Dept., an expert on Final Cut Pro, and Cristian Felix of IT. The three of them have determined that it is necessary to replace the existing computers. They have also determined that the 3.2 gigahertz processor would suffice. There is also a more costly (\$2,800) 4 gigahertz model.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

These computers are entirely for the students' use. The goal is to make it possible for students to learn to use cutting-edge video editing software, an important storytelling tool in contemporary journalism. With new computers, students will no longer have to deal with the very frustrating delays and glitches they experience with the current computers.

We recommend that the student newspapers--Kingsman and Excelsior--get the first shot at acquiring some of the old computers for their offices if they want them. These computers are still good for layout purposes, the newspapers' primary need.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

33

b. Who will supervise the facility and how will that be funded ongoing:

Individual faculty members supervise the facility during class time and for some periods between classes.

c. What physical space will be used to host the facility, and who has authorized its use:

Room 132 NE. It is the Journalism Lab of the English Dept.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

Please describe how many students will be served each term through the funding of this project, and through what means:

The primary beneficiaries are the 20 students who take Introduction to Multimedia Journalism each semester. But all journalism students who study in this room--where nearly every course in the Journalism Program is taught--would benefit. Nearly all of the eight to 10 courses offered each semester make heavy use of the computers.

How will projected outcomes be assessed?

Primarily through Prof. Howell, we maintain close contact with IT, frequently assessing the equipment in our Journalism Lab. We will report to IT on a regular basis on how the new computers are serving the students.

Student Technology Fee Proposal #2015-58

Embedding Technical Skills in the Physical Education Teacher Education Program: A Response to New York State Teacher Certification Demands

School: School of Natural and Behavioral Sciences
Department/Office: Kinesiology
Applicant Name: Blitzer, Laura
Additional Applicant(s):
Primary Contact for Proposal
Email Address: laurablitzer@brooklyn.cuny.edu
Phone: 305/815.2518
Estimated total cost: \$ 23,570.00
This project was approved in the prior STF year pending funding availability and was not yet funded

Description of Proposed Project:

Performance based assessment in Teacher Education has become a standard component of nationally accredited programs including those at Brooklyn College. edTPA as a capstone endeavor is a comprehensive portfolio used by all teacher education candidates in New York State to determine their readiness to teach and capacity to receive State certification. The focus of this pre-service assessment is student learning shown through the presentation of documents and video tapes that demonstrate a candidate's ability to effectively teach content to students.

Evidence of a candidate's ability to teach is drawn from subject-specific learning segments within a unit of instruction taught to a single class of students over 3-5 lessons. Multiple sets of data and materials are assessed as part of the edTPA scoring process including video clips of instruction, lesson plans, student work samples, analysis of student learning, and reflective commentaries. Submitted evidence - the edtpa portfolio - is reviewed by trained scorers and results are reported approximately 4 weeks following submission. Currently, our program lacks the technical equipment that supports the solid preparation of the critical video components of the portfolio. This proposal will fill this significant gap in our preparation process.

Estimated total cost: \$23,569.70

18 digital video cameras \$12,564
Sony 32GB HDR-PJ540 Full HD Handycam Camcorder with Built-in Projector (Black) - \$698

18 tripods \$1,529.10
Velbon Videomate 607 Aluminum Tripod \$84.95 ea

18 camera bags \$323.10
Pearstone Onyx 1030 Digital Camera/Camcorder Shoulder Bag \$17.95 ea

15 pocket video cameras \$4,485
Canon VIXIA Mini Camcorder (Black) \$299 ea.

30 Memory Cards for Pocket Video Cameras \$988.50
SanDisk 32GB microSDHC Memory Card Ultra Class 10 UHS-I with microSD Adapter \$32.95 ea

20 Wireless Microphones \$2980.00
Azden WLX-Pro/I camera Mountable VHF Wireless Lavalier/Headworn Mic System \$149 ea

Shipping approximately \$700

**nota bene

Prices listed are from B&H Photo

Items available from a number of sources with similar pricing including:

Amazon.com

BestBuy.com

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

edTPA focuses on the act of teaching. It is a multiple-measure assessment system aligned to State and National Standards and is designed to guide the development of curriculum and practice around the common goal of ensuring that new teachers are able to support preK-12 student achievement. Candidates present their skills in the edtpa portfolio demonstrating the ability to plan effectively, to teach competently using sound pedagogy, and to apply developmentally appropriate assessments.

The videotaping component is central to the presentation of a candidate's edTPA portfolio. Focusing on the 3-5 lessons from a single unit, 2 video clips totaling 20 minutes of instruction will highlight an instructional sequence, along with follow up work with at least 3 focus students who may be English Language Learners, students with special needs and/or those needing remedial work to develop motor competencies.

Teacher Education Candidates are expected to gain permission to videotape these instructional sequences, to show themselves helping students develop competencies in the cognitive, motor and/or affective domains related to movement patterns, performance concepts, and/or health enhancing fitness through instruction for planned learning tasks, and to transition smoothly to, within, or from a learning task. (edTPA Assessment Handbook, K-12 Physical Education, 2014). The video serves to introduce a Candidate to a scorer and can greatly influence scoring outcomes. Scorers are expected to assess a candidate's engagement with students making this visual link a critical component of the portfolio.

Capturing any or all of the portfolio components requires training and an artful use of cameras, and audio devices. The inherent din that exists in physical education instructional areas gyms, fields, auditoriums, cafeterias, hallways can challenge even the most robust speakers. Additionally, there is a large amount of movement anticipated that can hamper the filming process, particularly relative to the small/focus group instruction. It is vitally important that candidates record their lessons as they instruct in case the filming audio is so sound corrupted that a text of the lesson must be provided to accompany the video submission.

Students in our program will benefit significantly when permitted to practice preparing the video and audio components alongside the copious documentation required for the edTPA portfolio. Opportunities exist in a number of courses that precede student teaching for these skills to be introduced, practiced and fine-tuned.

Objectives in summary:

Students will:

learn how to successfully operate video and audio equipment to successfully address requirements for edtpa portfolios.

develop, practice, and present preliminary video clips for review and evaluation within program courses.

prepare developmentally appropriate video pieces for submission to edtpa

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. **How many hours per week the lab will be open:**

b. **Who will supervise the facility and how will that be funded ongoing:**

c. **What physical space will be used to host the facility, and who has authorized its use:**

d. **If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

80-120 per semester

Courses in which enrolled students would use this equipment include:

KINS 4412 ? Student Teaching Seminar

Approximate enrollment 20-30 per semester

The edtpa process ? all writing and video production takes place during this capstone semester.

KINS 3080 ? Field Experience

Approximate enrollment 30-40 per semester

This class is a prelude to Student Teaching

KINS 3105 ? Instructional Strategies

Approximate enrollment 30-40 per semester

This course occurs 1-2 semesters prior to Student Teaching.

Additional courses may be added as fieldwork components are developed.

How will projected outcomes be assessed?

Expectations are that early skill development with technical equipment will prepare our students for a high level of success with edTPA evaluators. Data from score reports is recorded for use in program review and the CAEP accreditation process.

Additional anticipated outcomes include:

•Candidates developing confidence and skills needed for success in diverse, urban schools.

•Measurement of candidate ability to differentiate instruction for diverse learners, including English language learners and special needs students in physical education settings

•The inclusion of tech related assignments in listed and other courses within the program

Results will be used by the PETE program in the following ways:

•faculty and teacher education candidates will discuss the impact of candidates' teaching performance on student learning and determine ways to improve teaching.

•faculty will analyze meaningful and consistent data to improve and renew program curriculum.

Student Technology Fee Proposal #2015-66
Promoting Technology based Experiments in General Physics Laboratory

School: School of Natural and Behavioral Sciences
Department/Office: Physics
Applicant Name: Nakarmi, Mim Lal
Additional Applicant(s):
Primary Contact for Proposal
Email Address: MLNAKARMI@BROOKLYN.CUNY.EDU
Phone: 718-951-5000 x2
Estimated total cost: \$ 111,000.00

Description of Proposed Project:

Department of physics at Brooklyn College offers two general physics courses, each with its own algebra-based (Phys 1100 & Phys 2100) and calculus-based (Phys 1150 & Phys 2150) versions. Calculus-based versions are for physics and engineering students whereas algebra-based versions are mainly for natural science and other interested students. A three-hour laboratory is a compulsory part of each of these courses. Laboratory experiments are similar in both algebra-based and calculus based general physics. In recent years, we have seen a steady increase in students signing up for general physics classes and consequently we've had to open new sections in general physics classes. For Spring 2015, we have opened 4 new sections (lab classes) of general physics 1100 and 3 new classes of general physics 2100. The total number of student in our general physics classes is about 425 in the Spring 2015 semester. Similar numbers are expected in the Fall 2015 semester as well.

Due to the increase in student enrollment, the maximum number of students allowed in each laboratory section of general physics has also been increased from the traditional 18 to 24. These laboratory classes were originally designed for 18 students. The apparatus currently available for these laboratory experiments are actually not sufficient for 24 students. However we have no option than putting more than the ideal number of students in each group in those labs. Additionally, the apparatus have not been upgraded for more than a decade. For various reasons related to the insufficient availability and quality of our apparatus, we get lots of complaints from students regarding general physics labs. This document describes how we propose to improve the quality of teaching in our labs and address these complaints. Last summer, we did an inventory of the apparatus in both general physics laboratories and listed apparatus needed to prepare 12 full sets of experimental station. We found that some apparatus are obsolete and we cannot find replacements and some are available only in newer models. Faced with the reality of the entire situation, we thought it's time to upgrade our general physics laboratory promoting technology based experiments. There are several technology based physics apparatus for general physics labs developed from different companies such as Vernier Software & Technology and Pasco Scientific. These apparatus use digital or analog sensors that can be accessed from computer through an interface device. We have used some of them in activities and laboratory of general physics classes offered in Student Centered Active Learning Environment (SCALE-UP). Students' responses in SCALE-UP classes were very positive. We also found that conceptual understanding of the students in SCALE-UP is better than that in conventional classes. This is one of the reasons we would like to promote technology based experiments in general physics laboratory taught in conventional mode.

I have been heavily involved in developing materials for technology based activities, and laboratory in general physics classes offered in SCALE-UP mode. I designed, tested and prepared instructional manuals for the labs. Our department has asked me to lead in this project for modifying the labs in conventional labs. We have listed required apparatus and their estimated cost for Physics 1 and 2 separately in the attached tables. It is about \$50K for physics 1 and about \$63K for physics 2. These apparatus are not consumable. Thus it is a onetime investment that lasts for several years. If funded, we plan to purchase them in Spring 2015 and work on designing, testing and modifying manual in summer break. We chose computer interface devices are from Vernier since we have used them and are more familiar with. They are also relatively cheaper and provide good customer service.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

Students enrolled in the general physics spend 3 hours in a lab every week out of 7 contact hours in these courses. Students actually learn concepts of physics when they have hands-on experience of the physics principles discussed in the lecture. We have witnessed that technology based laboratory enhance conceptual understanding of physics. Thus, it is expected that this project will have significant impact on students' conceptual learning of physics which will be their important asset that can be implement in their whole life. For example, chances of getting higher scores in MCAT can be expected with better conceptual understanding for pre-med student.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

45

b. Who will supervise the facility and how will that be funded ongoing:

Physics CLT, Alexander Sapozhnikov will supervise the lab. He is a full time chief CLT in physics department.

c. What physical space will be used to host the facility, and who has authorized its use:

Spaces used will be Physics labs room 2408N, 2409N, 2412N, 4420N and 4439N. All students, physics instructors and CLT have authority to use them while teaching.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

No renovation needed.

Please describe how many students will be served each term through the funding of this project, and through what means:

This project will serve ~ 750 students every year in the current enrollment situation. The number will increase if more sections are opened in Physics 1100 which is likely. Out of them about 75 students will be physics and engineering majors. Majority of the rest will be students in science majors including pre-med students. Since the project will improve laboratory apparatus in general physics labs, once the project is completed it will serve through the laboratory teaching to all students enrolled in general physics 1 and 2 labs for many years to come.

How will projected outcomes be assessed?

Assessment of the student's outcomes will be made from both qualitative and quantitative measures of learning outcomes via questionnaires and short tests. Standard Force Concept Inventory (FCI) will be used for quantitative assessment in general physics 1, whereas Conceptual Survey on Electricity and Magnetism (CSEM) will be used in general physics 2. They are standard assessment tests developed by Physics Education Research to assess conceptual understanding in general physics. Pre-tests will be administered to all students before the first lab and post-test will be given in the last lab of the semester. Gain will be calculated based on the improvement during the semester. Qualitative measure will be obtained via feedback from students at the end of semester. Feedback from instructors will also be collected from instructors for qualitative assessment.

1. List of apparatus for Physics 1

S.N.	Item	Quantity	Unit price	Estimated price
1	Vernier LabQuest 2 package	14	1000	14000
2	Vernier cart and track	14	300	5200
3	Web camera	14	50	700
4	Computer	6	1500	9000
5	Air Blower	6	550	3300
6	Motion detector	14	80	1120
7	Force table for vector	6	175	1050
8	Vernier track, carts and fans	14	400	5600
9	Vernier caliper	15	60	900
10	Micrometers	15	15	225
11	Centripetal force apparatus	4	1100	4400
12	Torque kits	14	50	600
13	Frictionless rotation apparatus	5	1500	7500
14	Mechanical equivalent of heat apparatus	4	560	2,240
15	cylinder	8	160	1,280
16	Vibrator	4	200	800
17	balance	12	200	2400
18	Other- tools, meters, stop watch			1000
			Total	\$50390

2. List of apparatus for physics 2

s.n.	Item	Quantity	Unit Price	Estimated Price
1	Vernier LabQuest	14	\$330	4620
2	Computer	4	\$1500	6000
3	HV power supplies	5	\$800	4000
4	Equipotential Surface Plotting	12	\$200	2400
5	DC power supplies	14	\$200	2800
6	Circuit Board	14	\$90	1260
7	Pasco Faraday's Law apparatus	13	\$410	5330
8	Function generators	13	\$680	8840
9	Resistor decade boxes	4	\$180	720
10	Spectrometers	4	\$1000	4000
11	Coulomb's law apparatus	5	\$1,360	6800
12	Vernier voltage probes	14	\$40	560
13	Multi-meter	12	\$220	2640
14	Vernier Optics kits	14	\$170	2380
15	Vernier Optical bench	12	\$240	2880
16	Prisms, lens, mirrors	12	\$30	360
17	Capacitors, Inductance, connecting wires			200
18	G-M counter	6	\$850	5100
19	G-M tube w/holder	6	\$350	2100
			Total	\$62,990

Student Technology Fee Proposal #2015-41

Metis Cluster Renewal

School: School of Natural and Behavioral Sciences
Department/Office: Computer and Information Science
Applicant Name: Whitlock, Paula
Additional Applicant(s): Goetz, Lawrence
Gross, A. Murray

Primary Contact for Proposal

Email Address: whitlock@sci.brooklyn.cuny.edu
Phone: 718-951-5657
Estimated total cost: \$ 19,700.00

Description of Proposed Project:

We seek to replace the aging and rapidly deteriorating hardware used for the Metis cluster. In use for over 10 years, in the past year alone we have lost our gigabyte switch, 1 of 7 motherboards, 3 video cards, and we have one motherboard whose operation is unreliable. Since Dell declines to service the Metis machines because of their age, we wish to replace our 6 large workstations with contemporary machines of similar capability, the router machine used as the head of the cluster, and the switch used to connect the workstations and cluster head. The workstations should have quad-core processors, 12-16 GB of RAM, disks larger than 50 GB, and at least some CUDA capability. The router head, which is used to connect to the external internet and provide NAT to allow access to the workstations by authorized users, should be a PC with a dual-core processor, 4-8 GB of RAM, 50 GB disk, and 2 network ports. The switch required should be a gigabyte switch with 8 or more ports; no programming capability is required. No construction or wiring is required, since the infrastructure for the cluster is already in place.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

For more than 10 years the Metis cluster has been, and continues to be, used for graduate and undergraduate research and instruction in an unrestricted environment that is not available anywhere else on the Brooklyn College Campus and provides significant pedagogical advantage over the (necessarily) restricted environments available elsewhere. The cluster has provided support for modification of the distributed Haskell run-time system (patches fixing a serious race condition were sent to the developers, and the use of PVM to support clustering was replaced by socket-level programming), research on optimal work-distribution disciplines, instruction on software installation and network administration, compiler development (BPrologue), instruction on system level programming in a distributed (cluster) environment, a quantum computing simulation, research on distributed memory, research on hardware for optimal management of distributed memory, and robotics. This semester there are 4 students working on a robotics project, 2 students working on network administration for distributed computing, and a class of 25 students working on network programming at the system (socket) level. We expect there to be a continuing need indefinitely into the future for the Metis cluster to provide the same sort of support for student development as it has in the past.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

40 hours

b. Who will supervise the facility and how will that be funded ongoing:

The faculty involved in the student projects oversee the cluster usage. This includes Murray Gross who oversees many students in undergraduate projects.

c. What physical space will be used to host the facility, and who has authorized its use:

What physical space will be used: The existing lab space in 2117N will be used; its use is authorized by the CIS department.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

The request is for computer hardware. A small machine for the metis router, a switch and six multicore workstations.

Please describe how many students will be served each term through the funding of this project, and through what means:

The number of students served each semester varies as a function of the courses available. Over its lifetime, the number of students (faculty is excluded from this count!) served in any given semester has varied from 10 to upwards of 30. As noted elsewhere in this proposal, the Metis cluster, which we seek to renew, provides an unrestricted computing environment that provides a significant pedagogical advantage over the (properly) sandboxed environments available elsewhere on the campus. From a teaching standpoint, there is great value in allowing student errors that would be harmless in a sandboxed environment to directly challenge the students.

How will projected outcomes be assessed?

Success is assessed by the ability of the students, both undergraduate and graduate, to complete their projects effectively on the metis cluster. Each semester the faculty overseeing the CISC 4900 and CISC 5001 projects file a evaluation of the student performance.

Improving Performance of Distributed Haskell in Mosix Clusters

Lori Collins¹, Murray Gross¹ and P.A. Whitlock¹

Department of Computer and Information Sciences, Brooklyn College
2900 Bedford Avenue, Brooklyn, NY 11210-2889

Abstract. We present experimental results demonstrating a qualitative improvement in the performance of a Parallel Haskell implementation in a cluster environment in which PVM intermachine communication has been replaced by process migration under the control of the Mosix patches to the Linux kernel. Together with the software modifications that have been made to the Haskell run-time system, this performance improvement has implications in the area of automatic run-time optimization.

Introduction

Much progress has been recently made in the development of parallel and distributed Haskell compilers[1–4]. Haskell is a functional language[5] that exploits lazy evaluation which, in some cases, speeds up computations. We have implemented the Glasgow distributed Haskell (GDH)[6] compiler and run-time system on a cluster of computers managed by the Mosix distributed operating system[7]. Mosix mimics the behavior of a symmetric multiprocessor by allowing dynamic process migration. We expected that for parallel Haskell programs running on the cluster, the greatest efficiency would be achieved using distributed Haskell with multiple calculations executing on each real processor. Such behavior was observed by others executing conventional parallel procedural programs on the cluster[8]. However, the GdH compiler, version 5.04, distributed only one computation per processor. Investigation of the run-time environment revealed that this was due to the Parallel Virtual Machine[9] (PVM) functions called by the Haskell compiler to achieve distributions of tasks. Since we use the compiler with a distributed operating system, it is not necessary to use a message-passing library. Therefore, the Haskell run-time system was modified to remove all calls to PVM functions and extensive testing was performed. This paper describes the changes made and reports the results of the tests.

Parallel and Distributed Haskell

Functional languages' main dissimilarity to imperative languages is that they do not consist of a sequence of steps to solve a problem; instead, they translate tasks into expressions that are then evaluated. These expressions look similar to those

expressions that are found in a mathematical context, which makes the language more intuitive. In fact, functional languages have been said to offer programmers a closer semantic feel because their syntax tends to yield code very similar to formal statements of algorithms[10]; indeed, a “pidgin” Haskell is frequently used to write out such formal descriptions, which then need only minor modifications to convert them to executable code.

While functional languages provide a number of advantages over procedural languages to the programmer[11], four characteristics are particularly important in the area of parallel and distributed execution: (1) functions in functional languages are generally first class values, i.e., can be passed from one function to another in exactly the same way as ordinary data; (2) once a value is bound to a variable it cannot change (referential transparency); (3) in some functional languages, Haskell in particular, function evaluation is lazy and (4) side effects are forbidden except in the rare cases such as I/O where they cannot be avoided[12].

Now, by lazy execution we mean that computation of values is delayed until they are actually required, which, among other things, effectively eliminates the commonplace practice of pre-computing values that might (or might not!) be used in subsequent computation. This is clearly important in parallel computing, because it means that there is no need to delay parallel threads while values that will not be used are being computed. This provides an obvious and, in many cases, major potential for reducing overall (wall-clock) computing time.

In combination with lazy execution, the first-class status of functions, referential transparency and the prohibition against side effects provide potentially radical reductions in coordination delay and overhead. Once a value is computed by the first process that requires it, it may be freely used by any process in the computation without fear of change at an inappropriate time, or, indeed, any change at all. The end result is that processes can block on values only while they are currently being computed (a delay that cannot possibly be avoided), and there is no need to be concerned with whether a value is “current,” or even, for that matter, available. If it is available, it is current, and if it is not yet available, it can be computed by whichever process first requires it.

The effect, then, of the specific language characteristics we have considered above is to cause parallel Haskell programs to serialize on critical paths rather than on the programmer’s conceptual scaffolding. Since it is clearly impossible to improve performance beyond what is obtained on critical paths, optimal performance is obtained without programmer intervention, with the obvious consequence that the programmer can concentrate without distraction on underlying algorithms. The entire issue of scheduling and coordination has been abstracted out of the problem by the simply expedient of using an appropriate programming language.

Mosix Operating System

Our distributed calculations are run on a cluster that consists of 15 interconnected computers currently running the Debian Linux operating system with

OpenMosix patches[7] overlaid on the operating systems. Mosix is a cluster management system that makes a cluster of separate computers run like a symmetric multiprocessor (SMP) by using algorithms and techniques that support resource sharing by dynamic process migration[7]. It works by extending the kernel so that the nodes can cooperate and share resources. This is ideal in heterogeneous configurations, since it automatically performs load balancing on processors[13].

Most clustering software either coordinates parallel programs operating on the independent units of the cluster or facilitates communication between independently executing programs on separate processors using parallel libraries[14, 15]. In contrast, Mosix achieves its effect by physically moving images of independent processes off its "home" machine onto slaves in a manner designed to balance the load across the available CPU's. Requests for system services are trapped by the Mosix software, executed on the home machine when they cannot be performed on the slave machines and then the results are transmitted back to the slave machine in a manner that is transparent to the running processes. In effect, each process "believes" it is still running on the machine on which it was spawned. A special high-efficiency file system[13] that is part of the OpenMosix package permits processors to access files on other processors with minimal overhead¹. This means that data can be distributed across the entire cluster and there are only a few clearly defined conditions that prevent dynamic migration of tasks from one machine to another.

Modification to the GdH compiler

Two major changes were made to the GdH run-time system to optimize its performance in a Mosix environment. In the original design PVM was used for all remote process creation and communication. Rather than building a virtual machine of virtual processors provided by PVM processes, our (modified) version of the run-time system builds a virtual machine of virtual processors created by the simple expedient of forking local processes (which will be moved about to remote processors by Mosix). The `send()` and `recv()` calls in PVM were replaced by local system calls. Much discussion revolved around how individual values were to be passed between the processes. For example, with the Mosix OS, it would be possible to use multiple pipes to transmit data since Mosix would trap the writes to the pipe. However, this is not a general solution and it was decided to use an UDP-based communication. After error testing of our new GdH-BC compiler² it was necessary to test whether the hypothesized efficiencies had actually been achieved[16].

¹ It would be useful to gather statistics on how well Mosix is doing to determine its effect and efficacy with respect to automatic run-time optimization

² Changes to the Haskell compiler were performed by Dino Klein and Qing Shou in Spring, 2003. The testing of the changes were initiated in Fall, 2003 by Qing Zhou and Kerim Simsek and continued into Fall, 2004.

Performance Results

Baseline tests were needed to gain an improved understanding on how these changes have affected the system. This section describes the results from the runs of the sequential code `ffactsm_seq`, used to validate the parallel results, and the parallel code `ffactsm_par`, from the Parfact benchmark suite. The `ffactsm_seq` program was compiled with the non-parallel GHC[5] and run on a single processor. The program `ffactsm_par` was compiled by our new modified PVM-free version of GdH-BC and run on fourteen or fifteen real processors. There were twenty-six sets of arguments run three times each with varying execution times. The serial and parallel calculations gave the same answers in all cases. In addition to validating our results we have calculated, shown in figure 1, the speedup between the serial and parallel calculation. The speedup is a measure of relative performance defined as:

$$S = \frac{\text{Execution time on a single processor, best sequential algorithm}}{\text{Execution time using } p \text{ processors}} \quad (1)$$

As expected we saw a decrease in execution time from our parallel calculations in comparison to our serial execution times. However it should be noted that Mosix gathers execution time statistics before distributing a calculation. So quickly completed calculations are not distributed as extensively as longer calculations.

Fig. 1. Observed speedup, as defined by Eq. (1), when the test program was run in parallel using GdH-BC

While testing `ffactsm_par` with different numbers of processors, we decided to see what would happen if we requested more processes than processors (i.e., with different numbers of virtual processors). We varied the number of processes between 15 and 60. It was immediately qualitatively clear that there was an improvement in performance because a reduction in total execution time was obtained. A series of quantitative experiments confirmed the qualitative findings. In figure 2, the total timings from runs with a fixed number of processes are shown. In the figure, we have included the average of the three best run results to show overall the decrease we have seen when more than one process per processor is requested.

As we add processes up to a number equal to the number of processors the execution time decreases approximately linearly, as we might expect. However,

Fig. 2. Averaged total timings from parallel runs of the test program with a fixed number of processes

once there are more processes than processors the execution time continues to drop until an equilibrium point is reached and the running time begins to increase with the number of processors. We think it safe to say that the increase in running time when the number of processes increases beyond a "balance point" is the result of increases in system overhead associated with process coordination and load balancing.

Conclusions

We conclude that the original design of the GdH run-time system, which refused to permit more than one PVM session, enforces a performance barrier that need not be present. Though PVM is freely available and widely used, its technical deficiencies have sparked the development of more modern message passing library standards[15]. So, rather than a micromanagement approach to load distribution as used in GdH, we find that at least under some circumstances, a contention driven supervisory model outperforms an excessively limited load-balancing approach. We need to continue to conduct further tests on the modified run-time system using available model applications and additional model (toy) applications developed for testing and validation. We feel that Haskell is a better fit to parallel and distributed calculations than its more problematic imperative counterparts because of its inherent parallelism, which speaks to the importance of continued development of language and compiler.

Acknowledgments

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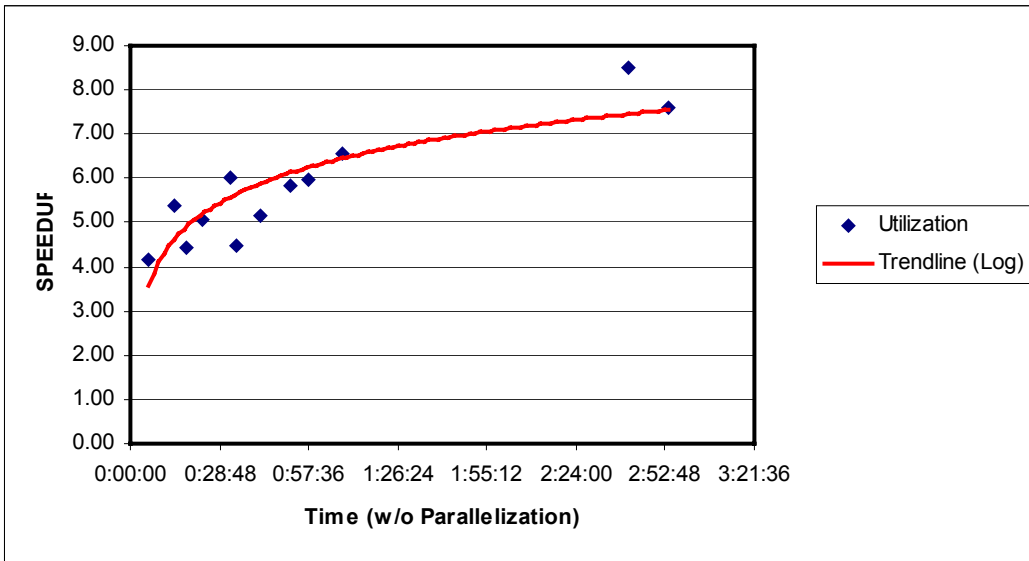


Figure 1- Speedup

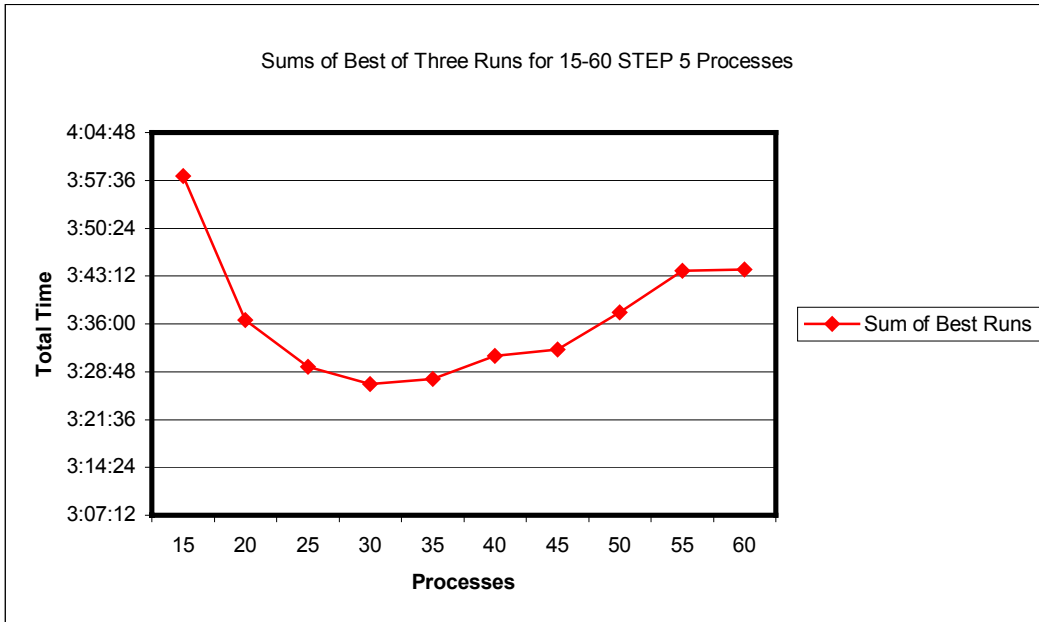


Figure 2- Runtime Results

Generalizing Sudoku to three dimensions

Tiffany A. Lambert and Paula A. Whitlock

Abstract. The well-known logic puzzle Sudoku can be generalized from two to three dimensions by designing a puzzle that is played on the faces of a cube. One variation, already introduced as a puzzle by Dion Church, uses three adjacent faces. Another variation uses all six faces. We have developed a set of rules and constraints for both three-dimensional Sudoku variations and have studied the properties using the method of simulated annealing.

Keywords. Sudoku, Simulated annealing, stochastic games, Markov chains.

2010 Mathematics Subject Classification. 65C40, 91A15.

1 Introduction

Sudoku is a logic puzzle consisting of a $n^2 \times n^2$ grid of cells partitioned into n^2 $n \times n$ blocks. When completed, every row, column and block in the puzzle must contain the numbers $1-n^2$ just once. A Sudoku puzzle comes with some cells assigned values, called fixed cells, and the empty cells are to be filled in by the player. Published puzzles usually have $n = 3, 4$ or 5 and the rules can be summarized as:

- Each row of cells contains the integers 1 through n^2 exactly once.
- Each column of cells contains the integers 1 through n^2 exactly once.
- Each $n \times n$ block of cells contains the integers 1 through n^2 exactly once.

The general problem of solving Sudoku puzzles is known to be NP-Complete [1], and many methods have been developed to obtain optimal solutions. The Sudoku examples most people are familiar with are called *logic-solvable* because a logical chain of reasoning will usually lead to a solution. But there also exist puzzles whose solution can only be found by guessing a random solution or by applying brute force iteration through all possible combinations. Calculating exactly how many unique puzzle solutions exist is an interesting combinatoric problem [2, 3].

As the popularity of Sudoku has grown, so has the number of playing variations. There have been several attempts to make Sudoku more challenging [1, 4]. A particular version, published several years ago, was Dion Church's attempt at three-dimensional Sudoku, shown in Figure 1, which is played on three faces of

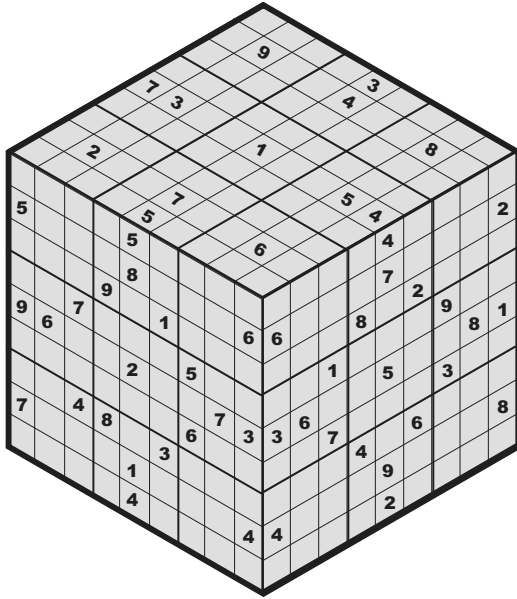


Figure 1. The original three face Dion Church puzzle.

a cube [5]. In the original published version of the puzzle, each face followed the traditional rules for the Sudoku puzzle. In addition, the cells on the edges of each face matched.

This paper describes the analyses of puzzles similar to the one proposed by Dion Church. We also discuss the extension of the puzzle to the six faces of a cube. We label both these versions three-dimensional Sudoku.

2 3D Sudoku puzzles

2.1 The three face model

Our three-dimensional Sudoku models have a much larger state space than a regular two-dimensional Sudoku puzzle. In our first variation with three faces, each face is an individual puzzle and follows the traditional rules of Sudoku. The size of the individual blocks on each face studied here may have either $n = 3$ or $n = 4$. The latter will yield a face that is a 16×16 grid. The edges where the faces meet require additional constraints. We considered both the original Dion Church puzzle constraints which stipulate that the cells on the face edges must match as shown in Table 1 and the alternative, shown in Table 2, that the cells on the edges must differ.

1	9	5	3	6	2	7	8	10	16	12	11	4	13	15	14
1	9	5	3	6	2	7	8	10	16	12	11	4	13	15	14

Table 1. A sample edge of two faces where the cell values match when $n = 4$.

1	9	5	3	6	2	7	8	10	16	12	11	4	13	15	14
16	4	2	11	7	9	13	14	10	5	15	3	6	8	12	1

Table 2. A sample edge of two faces where the cell values do not match when $n = 4$.

2.2 The six face model

Our extended version of a three-dimensional Sudoku puzzle considers the six faces of a cube. Opened out to two dimensions, the puzzle can be displayed as in Figures 2 and 3. For simplicity, completed puzzles with a block size of 2×2 are shown. The puzzle in Figure 2 has the constraint that cells on the face edges do not match in value. Figure 3 illustrates the alternative constraint that puzzles on the edges do match. While the diagrams in Figures 2 and 3 seem to imply that the faces could be considered independently, this is, of course, untrue. Every face is dependent on four other faces.

The techniques for solving Sudoku puzzles are many and use such approaches as logical search methods [6], constraint programming [1], and genetic algorithms [7]. Because the three-dimensional state space is large, a general and efficient method was needed. Lewis [8,9] used simulated annealing [10] to investigate the properties of two-dimensional puzzles. This algorithm searches for the optimal solution to a problem by using Monte Carlo methods [11].

3 Simulated annealing applied to solving Sudoku puzzles

With simulated annealing, an optimization problem is organized to use a cost function, $U(X)$, to measure how close a proposed solution is to an optimal solution. The probability distribution of the proposed solutions is given by

$$F(X) \propto e^{-\lambda * U(X)} \quad (3.1)$$

where λ is labeled an “inverse temperature.” The cost function has either a maximum or a minimum when an optimal solution is located. The search algorithm begins at a “high temperature” which allows large excursions into the initial search space. As the cost function value changes, the value of λ changes according to a cooling schedule.

				4	1	3	2				
				3	2	1	4				
				2	3	4	1				
				1	4	2	3				
1	2	3	4	2	3	4	1	4	2	1	3
3	4	1	2	4	1	2	3	1	3	4	2
4	1	2	3	1	2	3	4	2	1	3	4
2	3	4	1	3	4	1	2	3	4	1	2
				2	1	3	4				
				3	4	1	2				
				4	3	2	1				
				1	2	4	3				
				4	3	1	2				
				1	2	4	3				
				2	1	3	4				
				3	4	2	1				

Rule 1

Figure 2. A complete six face puzzle when $n = 2$. In this case the edge cells do not match.

In Lewis' approach [8] for the two-dimensional puzzle, all empty cells of the initial puzzle are filled in randomly within each block. The random values are chosen from 1 to n^2 where the fixed cell values in the block have been removed from the list. The cost function is then computed as the sum of the values in the cells of each row and column. In a completed, correct puzzle the contribution to the sum per row or column is $(n^2 + 1) * n^2 / 2$ and this is subtracted from the cost function. A solution has been found when $U(X) = 0$. The algorithm proceeds by proposing a random swap between two non-fixed cells in a block and the cost function is recalculated. The swapped values are always accepted if the cost has decreased. However, this iterative improvement may get stuck in a local minimum rather than finding the optimal solution. Simulated annealing, therefore, uses the Metropolis algorithm [12] as a means to escape local minima. The latter algorithm will accept a move probabilistically that increases the cost function. The number

				4	1	2	3				
				3	2	1	4				
				1	4	3	2				
				2	3	4	1				
3	2	4	1	2	3	4	1	4	1	3	2
1	4	2	3	4	1	2	3	2	3	1	4
4	3	1	2	1	2	3	4	1	2	4	3
2	1	3	4	3	4	1	2	3	4	2	1
				3	4	1	2				
				2	1	4	3				
				4	3	2	1				
				1	2	3	4				
				1	2	3	4				
				3	4	1	2				
				2	3	4	1				
				4	1	2	3				

Rule 2

Figure 3. A complete six face puzzle when $n = 2$. In this case the edge cells match.

of swaps attempted at each temperature, a Markov chain, is related to the number of empty cells. At high temperature, most of the swaps of cells are accepted. At a low temperature, only the most favorable swaps are accepted. The cost function approaches a minimum, 0, as the algorithm approaches a solution.

Lewis’s simulated annealing method is capable of producing a solution for both partially filled, as well as completely empty grids. Thus, it is not only a solver, but also a generator for all size Sudoku grids.

3.1 Application to the Dion Church Sudoku puzzle

We adapted the simulated annealing method and Lewis’s code to solve the Dion Church three faces of a cube puzzle. The two-dimensional puzzle was represented in the simulated annealing code as a two-dimensional array of values. To ac-

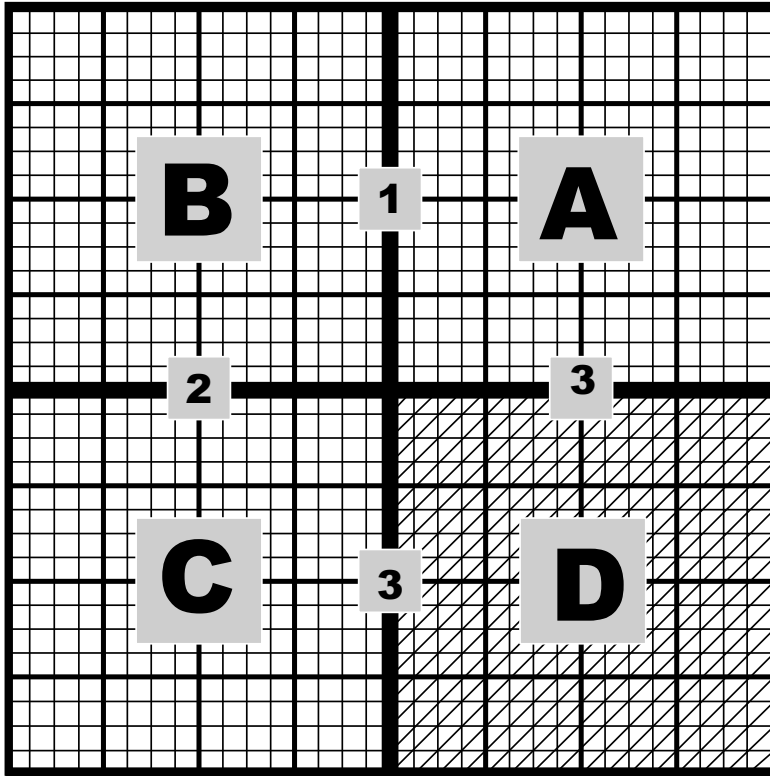


Figure 4. Implementation of the 3-face puzzle in the simulation.

commodate the three-dimensional puzzle, the array was expanded to a size of $2n^2 \times 2n^2$. The array was divided into four quadrants, one for each face, with the fourth quadrant unused, see Figure 4. The edge constraints were implemented so that the edges correspond as follows:

- Edge A1 adjoins edge B1
- Edge B2 adjoins edge C2
- Edge C3 adjoins edge A3

In order to configure the edge constraint into the cost function, $U(X)$, in Eq. (3.1), we added an edge contribution to the row and column cost. For every edge cell that fails the constraint condition, we added one point to the total edge cost function. This amount is consistent with the column and row sums and has a sufficient influence in accepting or rejecting a move.

The six faces of a cube puzzle was implemented as two parallel $2n^2 \times 2n^2$ arrays with the added constraints that every edge is dependent on another face. The Markov chain of moves involves swaps in both the parallel arrays. Furthermore, every time an edge cell is swapped, its value must be compared with an edge cell of the neighboring face. This made the determination of a solution very slow.

3.2 The cooling schedule

In the two-dimensional case [8], the temperature was decreased by 1 % after the annealing process equilibrated, i.e. completed one Markov chain of moves, at each inverse temperature. We refer to this as a 99 % cooling rate. It worked well for the two-dimensional 3×3 grids, but in the larger three-dimensional puzzle with edge constraints, the constant cooling schedule was no longer efficient. Increasing the change in temperature to 5 % (95 % cooling rate), 10 %, or 15 % did improve the efficiency of the code, but increased the occurrence of freezing into non-optimal solutions. This led to experiments with dynamic cooling schedules in which the temperature decreases by a larger amount initially, and then at a much slower rate as the system approaches a solution. To achieve this, we made the cooling rate a function of the cost, so as the cost function decreases from its initial state, so does the change in temperature. The resulting algorithm is greedy and much more efficient.

In Table 3, the average times using constant percentage changes in the temperature are shown. Reheats to a high temperature were performed if the algorithm could not find a solution for a run within the allocated time. Reheats were allowed to occur three times before the algorithm terminated the search. Both sets of edge constraints had similar behaviors.

Increasing the size of the temperature change from 1 % to 20 % did lead to faster calculations. However, from Table 3, it is clear that a cooling rate less than 70 % causes the system to cool too quickly and not find a solution. The run times for several dynamic cooling schedules are shown in Table 4, where the cooling rate is dependent on the change in the overall cost function. The corresponding

	50 %	60 %	65 %	70 %	75 %	80 %	85 %	90 %	95 %	99 %
Avg (sec)	562	383	296	103	55	43	92	80	166	853
Std. Dev.	n/a	n/a	n/a	207	71	24	100	100	26	135
Reheats	yes	yes	yes	yes	yes	no	yes	no	no	no

Table 3. Timings for solving a 3-face Sudoku puzzle with constant cooling rates. n/a indicates that a solution was not found.

	A	B	C	D
Avg (sec)	286	58	116	29
Std. Dev.	171	59	151	13
Reheats	yes	yes	yes	no

Table 4. Timings for solving a 3-face Sudoku puzzle with dynamic cooling schedules.

A		B		C		D	
change in cost	cooling rate	change in cost	cooling rate	change in cost	cooling rate	change in cost	cooling rate
0	50	0	85	0	50	0	50
25	65	25	80	25	55	25	60
50	80	50	70	50	65	50	70
75	90	75	65	75	70	75	75
90	95	90	55	90	80	90	80
95	99	95	50	95	85	95	90

Table 5. The changes in cooling rate as a function of the change in the cost function from the initial value for different cooling schedules.

schedules are shown in Table 5. The timings with the dynamic cooling schedules are dependent on the initial cooling rate, the change in the cost function from the initial value, and the final cooling rate. Trial and error led us to cooling schedule D which has been the most efficient. This schedule improved the run time by more than 90% from the initial constant cooling schedule.

The three face algorithm can easily generate many unique Sudoku puzzles starting with an empty array and given a different pseudorandom number sequence. If the code is initialized with a partially filled in grid, it will find the unique solution or if there is more than one possible solution, it will find at least one of them in most cases. A completed puzzle generated by the simulated annealing code is shown in Figure 5. The 0's represent the nonparticipating cells in our representation of the puzzle.

4 Results

In the discussion that follows, the focus will be on the three face puzzle. The six face puzzle was solvable but took a very long time even for $n = 3$.

Logic solvability is still a question that is being explored. There are many papers employing different methods of solving Sudoku, but little work has been done

6	1	7	8	5	3	4	9	2	1	8	7	9	4	6	2	3	5
5	4	3	9	2	1	6	7	8	3	6	4	5	7	2	8	9	1
8	9	2	6	4	7	3	5	1	5	9	2	3	1	8	6	7	4
4	7	1	5	8	6	2	3	9	8	2	9	6	5	4	7	1	3
9	5	6	2	3	4	1	8	7	6	5	1	7	3	9	4	2	8
2	3	8	1	7	9	5	4	6	4	7	3	2	8	1	9	5	6
1	2	5	4	9	8	7	6	3	7	3	6	8	2	5	1	4	9
3	8	4	7	6	2	9	1	5	2	1	8	4	9	3	5	6	7
7	6	9	3	1	5	8	2	4	9	4	5	1	6	7	3	8	2
1	8	6	2	4	7	9	5	3	0	0	0	0	0	0	0	0	0
4	3	2	5	6	9	7	8	1	0	0	0	0	0	0	0	0	0
7	9	5	3	1	8	6	2	4	0	0	0	0	0	0	0	0	0
9	2	7	6	3	5	1	4	8	0	0	0	0	0	0	0	0	0
8	1	3	9	7	4	2	6	5	0	0	0	0	0	0	0	0	0
6	5	4	1	8	2	3	7	9	0	0	0	0	0	0	0	0	0
5	6	1	8	2	3	4	9	7	0	0	0	0	0	0	0	0	0
3	4	9	7	5	6	8	1	2	0	0	0	0	0	0	0	0	0
2	7	8	4	9	1	5	3	6	0	0	0	0	0	0	0	0	0

Figure 5. The internal representation of a completed three face puzzle in the simulated annealing code. The lower right quadrant is not part of the puzzle.

on the generation of puzzles. It has not been proven, but the smallest known number of fixed cells in a 3×3 that yield a unique Sudoku solution is 17 [4]. Moreover, it appears that at least 30% of the cells need to be fixed for the puzzle to be logic-solvable [8]. This idea is much harder to conceptualize in a three-dimensional space. Computing the minimum number of givens for a unique solution is an optimization problem that is NP-complete.

However, we can empirically study how many fixed cells are needed to produce a unique puzzle. Using a completed three face puzzle, m cells were systematically emptied, i.e. $m = 5, 10, 15, \dots$, their values removed, and the puzzle was resolved by the code with a different sequence of pseudorandom numbers. If the new solution was identical to the original puzzle after several repetitions of the process, the solution was deemed unique. For $n = 3$, if less than 100–120 cells are empty, that is 123–143 cells are fixed, the puzzle has a unique solution. However, preferentially removing the values in cells on common edges leads to multiple possible solutions when more than 45 cells are empty. For $n = 4$, solutions are unique when less than 260 cells are empty. Another issue involves which cells need to be fixed to maintain logic solvability by using a chain of reasoning. Sudoku solving programs exist that use strictly logical and/or human solving heuristics to both solve puzzles, and can be used to determine if the puzzle is logic solvable [6].

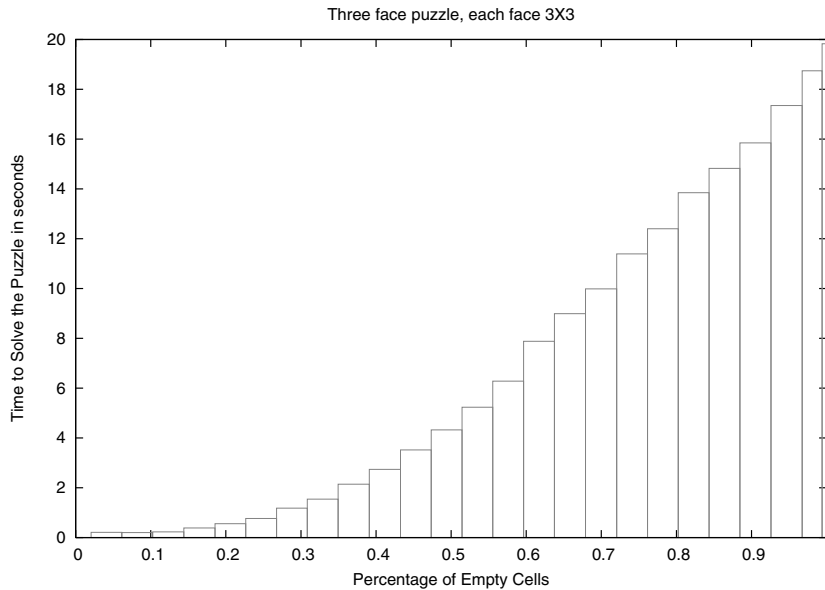


Figure 6. Average time to solve a three faces of a cube Sudoku puzzle when $n = 3$.

A fascinating aspect of using simulated annealing to find solutions to Sudoku puzzles is the existence of what has been called a “phase transition” in the time to solve a puzzle as the number of initially fixed cells changes. This behavior was first observed by Lewis [8] in the two-dimensional version of the puzzle as the value of n was increased from 3 to 5. We have performed similar experiments with the three faces of a cube puzzle. As the percentage of empty cells changes from almost 0 (an almost complete puzzle) to 100% (a puzzle with no fixed cells), the time to solve the puzzle increases. This reflects the fact that the search space for the almost complete puzzle is very small and increases as the percentage of empty cells increases. For $n = 3$, the increase in time is monotonic, see Figure 6. The time to solve a three face puzzle is shown versus the percentage of empty cells. Each bar represents the average time for trying to solve 20 independent puzzles. However, when $n = 4$, there are cases where no solution may be found even though the algorithm is allowed to execute for a long time. This is shown in Figure 7, where the arrows indicate cases where one or more of the puzzles were not solved in over a half hour of computing time.

That such cases exist is not surprising since the two-dimensional puzzles have been shown to be NP-complete. This very interesting phenomenon becomes harder to study as n increases as the time to solve the puzzle increases dramatically. For $n = 3$, a three faces of a cube puzzle starting with all cells empty, takes only

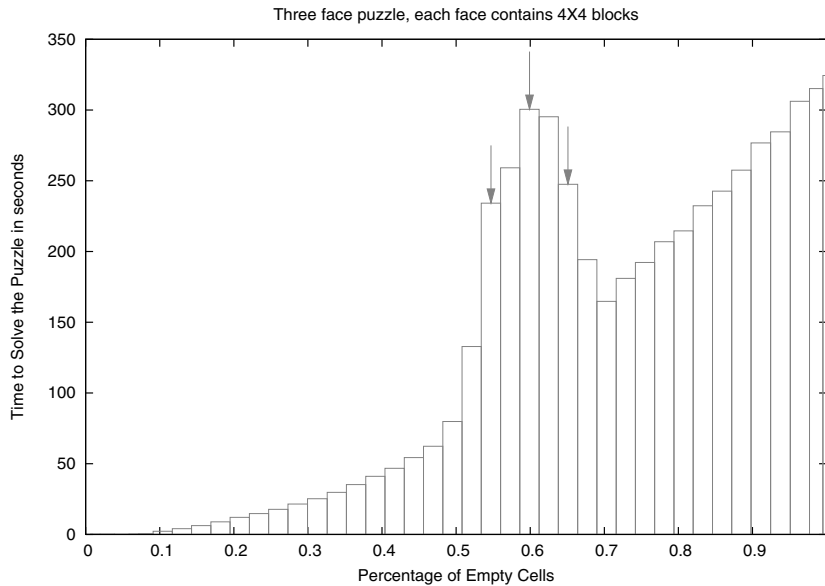


Figure 7. Average time to solve a three faces of a cube Sudoku puzzle when $n = 4$.

19 seconds to find a solution. When n is increased to 4, an initially empty puzzle takes over 325 seconds to find a solution. The case of $n = 5$ takes 20 times as long to solve compared to a $n = 4$ puzzle. We were unable to complete a study of the phenomenon with the six faces of a cube puzzle due to the enormously longer solution times.

5 Conclusions

From our experiments with the cooling schedule, we have determined that both changes in the cost function and the cooling rate are key factors in finding an optimal solution. As the difference between the initial cost and the current cost becomes larger, the cooling rate should become slower in order to restrict jumps to a much less optimal solution. By changing the cooling rate dynamically, we reduced the number of Markov chains that are started, thus decreasing the run time.

Trial and error was used to determine how many fixed cells need to be present to yield a unique solution. For $n = 3$, when cells were removed randomly from a completed puzzle, the percent of fixed cells was found to be at least 59%. For $n = 4$, the percent of fixed cells needed increased to 67%.

Experiments with the three face puzzle showed that the “phase transition” in the search time to find a solution observed in the two-dimensional puzzle is still present. As the search space becomes larger and the number of possible solutions increases, the time to find a solution dramatically increases. This occurs when the number of fixed cells decreases from 50 to 30 %. In some experiments with $n = 4$, no solution was found after several reheats of the algorithm.

To investigate the properties of the six face puzzle the simulated annealing algorithm needs to be made more efficient, perhaps by parallelizing the code. For example, multiple swaps could be performed in parallel (ensuring that the swapped cells are non-overlapping) and increase the efficiency of finding a solution.

An interesting extension of the current research is the relationship between the solving of Sudoku puzzles and the construction of point sets. It has been pointed out by Mullen [13] that sets of mutually orthogonal Latin squares can be used to construct (t,m,s)-nets and in some cases, the nets may have optimal properties. It has been suggested that the search by simulated annealing to find an optimal solution to a Sudoku puzzle could be related to finding (t,m,s)-nets with optimal parameters.

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Student Technology Fee Proposal #2015-33

Enhancing Undergraduate and Graduate-level Teaching in Next-generation Genomics

School: School of Natural and Behavioral Sciences
Department/Office: Biology
Applicant Name: Wilson, Anthony
Additional Applicant(s): Polle, Juergen
Biais, Nicolas

Primary Contact for Proposal

Email Address: twilson@brooklyn.cuny.edu
Phone: 6953

Estimated total cost: \$ 9,000.00
This project was approved in the prior STF year pending funding availability and was not yet funded

Description of Proposed Project:

Description of Proposed Expenditure: Five (5) floating licenses of Geneious R8 genomics software (<http://www.geneious.com/>).

I have requested 5 floating licenses of the Geneious R8 software package. Floating licenses provide increased educational flexibility, and will provide copies of the software accessible from any location on campus. Several members of the Biology faculty have already expressed an interest in incorporating bioinformatics modules into their own courses. My proposal anticipates the increased use of these tools across courses and departments, allowing the flexible implementation of Geneious modules into new and existing courses. Negotiations with Biomatters following the submission of last year's STF proposal yielded a 10% volume reduction on this purchase, reducing the anticipated costs by close to \$1,000. An updated quote for the Geneious R8 package accompanies this proposal.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

Next-generation genomics technologies are revolutionizing the biological sciences, and while these methods are still in their infancy, they are already informing drug discovery and treatment, species conservation and management, and our understanding of the earliest origins of life on our planet. The development of these new research technologies has created significant new employment opportunities in the fields of genomics and bioinformatics. As one example, the New York Genome Center (<http://www.nygenome.org/>), a public-private partnership incorporating a number of leading educational institutions around the city, has recently opened a new facility in lower Manhattan, and plans to hire 300-500 genomics specialists within the next 5 years.

With its strong focus on Molecular and Cell Biology (MCD), Brooklyn College provides high-quality educational and research opportunities in the biomedical field. As part of my recent hire at the College, I have been asked to develop a portfolio of courses in the fields of ecology and evolution, an effort to enhance student knowledge in these areas. Two foundational level courses have already been successfully launched (BIOL3007W ? Evolution and BIOL3083 ? Ecology), and I have recently initiated a new upper-level undergraduate course in Molecular Phylogenetics and Evolution (BIOL5020). This course integrates classroom instruction in phylogenetic theory with computer-based practicals focused on the evolutionary analysis of real-world datasets, and is aimed at providing students with the skills necessary for the analysis and interpretation of genomic level datasets. This new course offers Brooklyn Students exposure to next generation technologies and alternative career paths which have not previously been available through our curriculum.

Computer-based practicals will center on the use of the Geneious software package for the collection, annotation and management of genomic data. Working in small groups, students will procure real-world genomic data from public databases and gain practical skills in the analysis and interpretation of research results. Geneious provides specific educational modules for the interactive learning of bioinformatics methods, and offers a student-friendly interface which facilitates early-stage learning. After gaining proficiency with the use of the software, students will be encouraged to explore higher level functions, culminating in the full-genome assembly of a microbial species of biomedical relevance. Geneious is currently used by all 20 of the top 20 Universities globally and by seven of the 10 largest pharmaceutical companies. In gaining experience with the leading platform for the analysis of genomic data, students will acquire skills of immediate practical relevance, which will make them

competitive for positions with the leading biomedical and research institutes in the country.

If funding is requested for a lab, other public access technology facility, of other physical facility:

- a. **How many hours per week the lab will be open:**
- b. **Who will supervise the facility and how will that be funded ongoing:**
- c. **What physical space will be used to host the facility, and who has authorized its use:**
- d. **If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

Anticipated Student Enrollment: 60-90 students per semester

Course Usage: BIOL3007W Evolution, BIOL5020 Molecular Phylogenetics, BIOL U793.03 Genomics and Beyond

How will projected outcomes be assessed?

Students will be required to complete hands-on laboratory exercises in microbial genome assembly, and theoretical and methodological questions will be included on the final exams.



20 June 2012

Sole Source Statement

Supplier

Biomatters Limited, as scientific software development company headquartered in New Zealand and with an office in the United States, is responsible for creating and marketing the Geneious Pro™ and Geneious Server™ software applications. Geneious Pro and Geneious Server are only available from Biomatters Limited. Training in the use of Geneious Pro and Geneious Server as well as training for the development of plugins to Geneious Pro and Geneious Server are also only available from Biomatters Limited.

Products

Geneious Pro is a desktop based, internet ready, integrated and extensible software platform used by molecular biologists, discovery-phase pharmacological researchers and students. It provides sophisticated genetic and protein sequence analysis tools, protein and molecular visualizations, next-generation sequence data handling and analysis, literature and sequence database searching, storage tools for a sequence information and related data types in a single easy-to-use email-like application. Its revolutionary usability makes bioinformatics tools accessible to non-bioinformaticians. It also enables results to be produced more swiftly and more repeatably – and faster more accurate results means faster turnarounds on publication and faster discovery.

Geneious Server is a powerful server software package designed specifically for high-intensity computing. From their desktop, Geneious Pro users can simply offload heavy data crunching to Geneious Server for faster analysis of large volumes of sequence data. The server's power can be shared securely among teams of researchers leading to dramatically faster analysis and more discoveries. Geneious uses trusted, peer-reviewed algorithms to provide confidence in your results and these industry standard algorithms can be launched from the Pro client without having use unpopular command line code.

Unique features

Geneious incorporates unique features including:

- **Parallel Processing** - Geneious Pro is able to offload computationally intense operations such as Next Generation Sequence assemblies to Geneious Server for submission to a GRID

enabled cluster. In addition to standard Geneious Pro algorithms, Geneious Server also enables Pro users to access programs unavailable on the desktop client such as Velvet, Maq, BWA and Bowtie and genome alignment tools such as LastZ and MAUVE in a seamless integration. This allows users to harness high performance and large memory compute nodes to perform tasks that their desktop computer memory is incapable of; and to run the time-consuming analyses without having to exhaust their desktop computer resources.

- **Proprietary algorithms** - The Geneious Assembler™ has been designed for assembling large contigs of sequence data with attributes such as hybrid data support and fine tuning, including fine tuning of other assembler files. Advanced SNP calling capabilities have also been written by Biomatters' developers to be included in Geneious, and the ability to handle large contig and raw read files through a Graphic User Interface is also a unique feature. An exclusive agreement between Biomatters and Sinauer Associates has provided access to PAUP*, an advanced phylogenetic tool, which can be launched directly through Geneious Server.
- **Public API** - The functionality of Geneious can be customized and extended almost without limitation through the creation of third party plugins. With the help of the plugin writer's guide (part of the Geneious public API), anyone with basic programming skills can leverage what has already been created for any specific research need. The API can allow users to integrate both Pro and Server with other data sources and software and customize them to their own research environment.
- **Smart Agents™** - A unique feature of Geneious that enables researchers to train Smart Agents to search, retrieve and sort relevant data specific to user requirements from private and public databases such as NCBI, BLAST, Pfam and UniProt. Researchers can spend their time analysing relevant data, not sifting and sorting through volumes of data. The technology behind Smart Agents is under patent.
- **Secure Collaboration** - A world first in science software, researchers can work together within Geneious, share files and information on a project, and chat securely. This feature enables Geneious researchers to collaborate worldwide on critical areas of discovery.
- **Education Tutorials** - Giving students the ability to learn on their own, and professors the ability to teach bioinformatics to groups of students interactively is a highlight of Geneious. Students are guided through analyses and exercises with all the data and tool just a click away. Geneious also allows teachers to create their own tutorials using live links to data, and communicate with students using the built-in collaboration features. Geneious turns a mass of raw bioinformatics data into meaningful, visual information, simplifies research, and ultimately improves efficiency.

Awards Received

Geneious and Biomatters have been recognized in numerous national and international industry awards such as the 2009 Westpac Emerging Exporter of the Year at the Air New Zealand Cargo Auckland export Awards, the 2009 Recruit IT Innovative Software Product of the year at the PriceWaterhouseCoopers New Zealand Hi-Tech Awards, and was a 2009 Global Finalist in the IT Informatics category at the Bio-IT World Awards in Boston. In 2007, Geneious was awarded the United Nations World Summit Award in the category of e-science and a Computerworld Excellence

award for innovative use of ICT. Geneious has also been selected as the bioinformatics grid portal for the New Zealand national science and research network and is used in all of the top 50 Clinical, Pre-Clinical and Health Universities and 90 of the top 100 universities, as rated by Times Higher Education in 2010.



**Tony Wilson, Evolutionary Biology
Department of Biology**

2900 Bedford Ave. • Brooklyn, NY 11210
TEL 718-951-5000 x6953 • FAX 718-951-4659
<http://evolution.brooklyn.cuny.edu>

RE: Sole Source Documentation: Geneious R8 (Biomatters Inc.)

Dear Sir/Madam,

Biomatters Inc. produces and distributes Geneious R8, an integrated software platform for the analysis and processing of genetic and genomic datasets. Geneious offers unique functionality allowing its use in both teaching and research, and is the chief bioinformatics software used by all 20 of the top 20 Universities globally and seven of the 10 largest pharmaceutical companies.

Geneious R8 incorporates a wide-range of bioinformatic functions, including database storage and search, pairwise and multiple sequence alignment, 3D modelling and visualization, and phylogenetic tree construction. The software has been specifically designed for the management and processing of next-generation DNA sequence data and offers macro-driven bioinformatic workflow design, genome assembly and visualization tools, and sequence analysis, annotation and prediction, all within a common user environment.

Geneious R8 also provides unique features for education which allow teaching staff to create interactive tutorials and exercises. Students execute directed assignments, answer tutorial questions, and submit completed exercises for grading, all within the Geneious environment. Advanced students can carry out collaborative assignments/research on shared projects under the guidance of a faculty mentor, allowing them to further develop their bioinformatic skills in a real-world context.

While other software packages offer several of the functions included in the Geneious R8 software package (e.g. Sequencher – MSRP \$3180/license), Geneious R8 is unique in combining all of these features into a common computing environment, something which facilitates its use in both teaching and research. As no comparable software package is currently available, Biomatters is considered a sole source manufacturer of this product.

In light of the widespread use of this software package in academic and commercial labs, training on the Geneious R8 platform offers students practical skills of immediate relevance to future careers in genomics and bioinformatics. The denial of sole source classification in this case would compromise in-class educational opportunities, and put students at a competitive disadvantage relative to their peers at other universities in the NYC area.

If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Prof. Tony Wilson

BIOMATTERS

Biomatters Ltd

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Newark, NJ 07102
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Email: sales@biomatters.com
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Quotation # Q-23102014-10525

Date: 23 Oct 2014

Tony Wilson

City University of New York (CUNY) - Brooklyn College
Associate Professor, Evolutionary Biology Department of Biology
Brooklyn College 2900 Bedford Avenue Brooklyn, NY, 11210
United States
Email: twilson@brooklyn.cuny.edu

Qty	Product Description	Unit Price	Discount	Price (US\$)
5	Geneious R8 Non-commercial Floating Handling Fee	\$1,995.00	10.0%	\$8,977.50 \$25.00
Total				\$9,002.50

Software license keys and invoice are despatched on receipt of your purchase order. All licenses are valid from date of issue unless otherwise specified.

This quotation is valid until 30 Nov 2014.

Please email your purchase order to sales@biomatters.com, or fax it to +1 443 927 7894 for North America or to +64 9 379 5063 for the rest of the world.

RELEASES, UPDATES, SUPPORT

- Standard release purchases entitle the purchaser to a specified release (e.g., R7) and subsequent updates to the release (e.g., R7.1), but does not entitle purchaser to subsequent, unspecified releases (e.g., R8).
- Time-limited subscription entitlements include access and support for any currently supported release during the time period.
- Biomatters provides support to authorized users holding a valid entitlement for the most recent updates to the two most recent releases of the software.

GENEIOUS - LICENSE AGREEMENT

License terms and conditions for the use of Geneious are described in the Biomatters Software License Agreement for Geneious. Please review the terms of this agreement, as they must be accepted in order to use the software. See: <http://www.geneious.com/web/geneious/licence-agreement>

GENEIOUS SERVER - LICENCE AGREEMENT

The terms and conditions for the purchase of Geneious Server are outlined in the Geneious Server License Agreement. Please review the terms of this agreement and sign the contract before purchase or payment.

GENEIOUS SERVER - ADDITIONAL GENEIOUS LICENCES

*Please note: A valid copy of the latest version of Geneious is required for each user to interface with Geneious Server. Exact license numbers will be confirmed prior to invoicing.

GENEIOUS TRAINING

The terms and conditions for Geneious training are outlined in the Statement of Work Agreement. Please review the terms of this Agreement and sign before purchase or payment.

PAYMENT / PURCHASE OPTIONS

- Payment by credit card or PayPal is available for purchases made from www.geneious.com/store and does not attract a handling fee, although tax may be payable. Depending upon the license type ordered, license keys will be emailed within one hour to a maximum of two working days from order placement. If you do not receive an email with your key in this amount of time, please check your spam filter and/or email us on support@biomatters.com .
- To pay by wire transfer or check please fax an official purchase order to +64 9 379 5063, or email to sales@biomatters.com. License keys will be emailed within two working days upon receipt of your purchase order, and an invoice airmailed to your billing address.

- To pre-pay by wire transfer (i.e. pay prior to supply of license keys), a proforma invoice can be supplied on request by emailing sales@biomatters.com. License keys will be emailed to the designated recipient upon receipt of payment.

All Geneious purchases are subject to the Geneious Software Licence Agreement, details of which are available on www.geneious.com

Software Request Form (revised 10/2014)

Request may not exceed 3 single spaced pages of 11-point type.
Longer requests or smaller point type will not be considered.

Please submit the completed form electronically to STFREQUST@brooklyn.cuny.edu.

For questions, contact Anil Lilly of ITS at x5861

Deadline: 12/03/2014.

Please note that this form is required only for a proposal/request to purchase software that will be used for instructional purposes – not for research or personal use by faculty or staff. A committee of faculty and public lab managers reviews these requests to gauge:

- The true campus cost both initially and ongoing, and whether that cost is justified by the proposed use within a limited budget for software licensing.
- Whether the proposed functionality is available in other existing campus software tools
- Whether the products are technically compatible with college systems and infrastructure

1. Department/Office Name:
2. Applicant Name(s):
3. Primary Contact for Request(s):
4. Has this proposal been approved by the appropriate Dean, Chair or Area Head?
5. Description of proposed expenditure/project:
6. Estimated total cost: \$
7. Would you like to: Retire software? Introduce new software? Upgrade existing software?
Retire _____ Introduce _____ Upgrade _____
8. Will faculty need training on the new software?
9. Will software be used for specific courses? Which courses?
10. How many sections will be offered?
11. How many students will be using the software each term?
12. Does the college have a similar software tool already? If so, why is this new tool needed?
13. How will the new software effectiveness be assessed?

Student Technology Fee Request – Genomics Software for Teaching Purposes

Tony Wilson, Biology - 11/10/2014

Description of Proposed Expenditure: Five (5) floating licenses of Geneious R8 genomics software (<http://www.geneious.com/>).

Proposal Expenditure: 5 * \$1,995 + \$25 Handling – **10% discount = ca. \$9,000 (No run-on costs anticipated)**

Course Usage: BIOL3007W Evolution, BIOL5020 Molecular Phylogenetics, BIOL U793.03 Genomics and Beyond

Anticipated Student Enrollment: 60-90 students per semester

Proposal: Enhancing undergraduate and graduate-level teaching in next-generation genomics

Next-generation genomics technologies are revolutionizing the biological sciences, and while these methods are still in their infancy, they are already informing drug discovery and treatment, species conservation and management, and our understanding of the earliest origins of life on our planet. The development of these new research technologies has created significant new employment opportunities in the fields of genomics and bioinformatics. As one example, the New York Genome Center (<http://www.nygenome.org/>), a public-private partnership incorporating a number of leading educational institutions around the city, has recently opened a new facility in lower Manhattan, and plans to hire 300-500 genomics specialists within the next 5 years.

With its strong focus on Molecular and Cell Biology (MCD), Brooklyn College provides high-quality educational and research opportunities in the biomedical field. As part of my recent hire at the College, I have been asked to develop a portfolio of courses in the fields of ecology and evolution, an effort to enhance student knowledge in these areas. Two foundational level courses have already been successfully launched (BIOL3007W – Evolution and BIOL3083 – Ecology), and I have recently initiated a new upper-level undergraduate course in Molecular Phylogenetics and Evolution (BIOL5020). This course integrates classroom instruction in phylogenetic theory with computer-based practicals focused on the evolutionary analysis of real-world datasets, and is aimed at providing students with the skills necessary for the analysis and interpretation of genomic level datasets. This new course offers Brooklyn Students exposure to next generation technologies and alternative career paths which have not previously been available through our undergraduate curriculum.

Computer-based practicals will center on the use of the Geneious software package for the collection, annotation and management of genomic data. Working in small groups, students will procure real-world genomic data from public databases and gain practical skills in the analysis and interpretation of research results. Geneious provides specific educational modules for the interactive learning of bioinformatics methods, and offers a student-friendly interface which facilitates early-stage learning. After gaining proficiency with the use of the software, students will be encouraged to explore higher level functions, culminating in the full-genome assembly of a microbial species of biomedical relevance. Geneious is currently used by all 20 of the top 20 Universities globally and by seven of the 10 largest pharmaceutical companies. In gaining experience with the leading platform for the analysis of genomic data, students will acquire skills of immediate practical relevance, which will make them competitive for positions with the leading biomedical and research institutes in the country.

I have requested 5 floating licenses of the Geneious R8 software package. Floating licenses provide increased educational flexibility, and will provide copies of the software accessible from any location on campus. Several members of the Biology faculty have already expressed an interest in incorporating bioinformatics modules into their own courses. My proposal anticipates the increased use of these tools across courses and departments, allowing the flexible implementation of Geneious modules into new and existing courses. ***Negotiations with Biomatters following the submission of last year's STF proposal yielded a 10% volume reduction on this purchase, reducing the anticipated costs by close to \$1,000.*** An updated quote for the Geneious R8 package accompanies this proposal.

Student Technology Fee Proposal #2015-48
Access Control System WEB Club Rooms

Department/Office: Programming, Assessment and Training
Applicant Name: Green, Vannessa
Additional Applicant(s): Jackson, Ronald
Primary Contact for Proposal
Email Address: VGreen@brooklyn.cuny.edu
Phone: X 5964
Estimated total cost: \$ 30,500.00

Description of Proposed Project:

Install keyless entry to 20 student club offices and one exit door located in the WEB. The Card Access is a PC configured system that will customize entry to the club spaces.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

Each year keys are distributed to designated club leaders in order to access their office. Often these keys are not returned. Additionally, to avoid unauthorized access, the cores on the locks are changed annually. This new system will be more effective and efficient in that no keys would need to be distributed and the cost of replacing lost keys and time and effort to change the locks will be eliminated. This will also reduce the transition time for the incoming student leaders to gain access to their designated office space. Over time this will be a cost effective measure that will provide less demand on the system that currently exists utilizing the facilities office and the college locksmith. Students will be prepared during Executive Training to assume responsibilities for the new system.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

N/A

b. Who will supervise the facility and how will that be funded ongoing:

Central Depository, the same area that currently has oversight.

c. What physical space will be used to host the facility, and who has authorized its use:

Central Depository, the same area that has currently has oversight.

d. If any renovations or furnishings will be required to support the project, how will they be funded?

some minor repairs

pre-installment may be needed

and covered by the College.

Please describe how many students will be served each term through the funding of this project, and through what means:

This would impact the 20 designated student clubs and their entire membership on an annual basis. This project will grant them access to their offices much faster while also controlling access to improve safety and security.

How will projected outcomes be assessed?

The system is equipped to show who entered the space, the time, and the number of times each entry access code was used. Student satisfaction with the system will be assessed by means of a survey on the efficiency and ease in accessing their club spaces.



Giant Security, Inc. DBA Vertex Security
 205 Hudson St / 480 Canal
 New York, NY 10013

Phone: (212) 529 7159
 Fax: (212) 586 4330
 Email: info@vertexsecurity.com
 Web: http://www.vertexsecurity.com

Estimate
21112

Bill To: Brooklyn College Attn: Alex Rudshteyn 2900 Bedford Ave Brooklyn, NY 11210 Work: (718) 951-5342 Fax: (718) 951-4557 E-Mail: alex@brooklyn.cuny.edu	Work Location: 2900 Bedford Ave Brooklyn College Alex Rudshteyn 2900 Bedford Ave Brooklyn, NY 11210 Work: (718) 951-5342 Fax: (718) 951-4557 E-Mail: alex@brooklyn.cuny.edu
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Summary: Access Control System (Students Club)

Estimate Date	11/26/2014
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Qty	Description	Price	Amount
3.00	Supply Keyscan 8 Reader Control Panel	3,415.00	10,245.00
3.00	Suppl KeyScan Communication Board IP NetCom2P for Remote Control	392.40	1,177.20
1.00	Supply Electric Strike For Back Door - Hes 9400 Slimline Surface Mounted Heavy Duty Electric Strike - Satin Stainless	406.61	406.61
20.00	Supply Usacan Storeroom Function Leverset, 2 3/4" Backset, Chrome Finish	110.00	2,200.00
3.00	Supply Keyscan Communication Interlink Module	172.00	516.00
20.00	Supply HES Electric Strike Grade1 US32D Satin Stainless Steel Maximun 5/8 Inch.	126.30	2,526.00
21.00	Supply HID Prox Point Reader	176.40	3,704.40
1.00	Installing And Wiring: 20 Doors Access Control System, 21 HID Readers, 21 Elrectric Strikes, 20 Storeroom Function Lever Sets. We estimate the job approximately 7-8 days labor. ***After completion of job we will perform a system check up and will insure that it works properly***	9,000.00	9,000.00

Subtotal:	\$29,775.21
Tax:	\$0.00
Total:	\$29,775.21

Notes

***** Equipment will purchase directly from Anixter under state contract number PT 63201 *****

General Notes:

1. Card Access is a PC Configured system with the option to register, restrict and customize the cards, hours, doors and days for entry, etc....
2. Estimate are subject to change after 90 days.
3. Any change in products quantity or labor that is not qualified in this estimate will be additionally charged.
4. Customer will be responsible for building access arrangements to our technicians, All Work permits will be provided to/by Vertex Security before the job commences. Customer will be billed for any time delays due to required permits or forms which are under customer responsibility.
5. All wires will run in walls and ceiling where possible and on surface in moldings where not. Any necessary molding will be additionally charged.

Warranty Notes :

1. After completion of job Vertex Security will perform a system check-up. All labor and supplied hardware are under Vertex Security warranty for 90 days from date of installation completion. After Vertex Security 90 days of warranty hardware only is under manufacturer warranty where applicable. Guaranteed work done from 9-5 Monday-Friday. All materials or products are property of Vertex Security until paid in full. Accessories (cables,connectors,moldings etc... guaranteed 30 days). In case of future system failure, troubleshooting will be charged by hourly rate per technician.
2. Vandalized and stolen products are not under warranty, The warranty does not include electric glitches.
3. The purchaser shall be responsible for any patching, painting, ceiling tile replacement that may be required as a result of the proposed scope of work.
4. Unless specified, door hardware (electric strikes, magnet locks, door closers etc.) is not included in the quote.

CLIENT REQUIREMENTS FOR ALL CARD ACCESS SYSTEMS:

Customer must provide a Windows 7 Professional Or Ultimate Edition based PC for programming the card access system and a power outlet in proximity to the main control board location

Power: Client is required to provide a total of 1 Quad 110 Volt Outlets for use in close proximity to the Controller.

Change Orders: All Change orders should be written and submitted to Vertex Security at least 48 Hours in advance.

Integration: An IT Person or authorized Person(s) must be available for software installation and training. Please note that if an onsite IT profesional is not available than access to any networking equipment is required, including user names and passwords as well as all internet account information. Vertex Security is not responsible for the functionality of the network.

Please note that training offered in this quote for the specified access control system will be done by our technician who completes this job. Should a qualified person not be available for training upon completion of the job then any rescheduling of the training it will be additionally charged.

PAYMENT REQUIREMENTS:

Balance will be paid fully after completion

Student Technology Fee Proposal #2015-47
CollegiateLink

Department/Office:

Applicant Name: MIKHLI, JENNIFER

Additional Applicant(s): AWADJIE, JOSEPH
LUTZ, MICHAEL

Primary Contact for Proposal

Email Address: JENNIFERZMIK@GMAIL.COM

Phone: (347)554-1515

Estimated total cost: \$ 31,250.00

Description of Proposed Project:

The Student Governments of Brooklyn College proposes to acquire CollegiateLink, a new online tool that will improve student services and support college-sponsored student activities. CollegiateLink is the leading platform for promoting student learning and growth through co-curricular opportunities, while centralizing and organizing processes and procedures. CollegiateLink will streamline many campus activities processes and provide the following tools to manage student organizations:

- Customize an organization profile with content and graphics.
- Post articles to a campus news ticker and allow commenting on group discussion walls.
- Manage club rosters and fill positions with newly-recruited members.
- Send out e-mail or text messages (SMS) to specific officers, event attendees, or an entire organization membership list.
- Promote events through a virtual flyerboard that simultaneously includes all posted events on a campus-wide calendar.
- Hold secure online elections for open officer positions.
- Upload lists of students, send out invitations, monitor RSVP status, and track attendance using card-swipe or barcode readers.
- Approve service hours completed by organization members.
- Store electronic documents, photos, and other files and control who can access them.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

CollegiateLink will tackle the problem of decentralization amongst student groups on campus by providing each student club and organization with a dedicated web page eliminating the need for developing off site websites, while providing continuity for the group as they transition from year to year. Club members will be able to store all their club documents within the site, and club leaders and members will also be able to communicate easily across club lines. Elections for clubs will also be placed online eliminating the need for the timely process that is currently in place. Because each student will have their own individual profile in the portal, identifying student members of each club will be much easier.

The program will also create a more active environment amongst Brooklyn College students. Many students do not know how to contact clubs or become a more active member on campus. This portal will allow them to view all the clubs that exist on campus and reach out to those that pique their interests. Hence, this portal can be seen as club fair, all day, every day of the year. Also, given the centralized bulletin board and calendaring feature, students will be able to quickly view the events that are taking place at Brooklyn College, eliminating the problems of advertising events currently plaguing student clubs. Individual students will also have the capability of indicating how they choose to receive communications. The tool provides options for emails, text messaging, Twitter, and other social media tools. Thus, a club leader only needs to send a message once and the individual student will receive the information based on their own preference.

In addition, many students lack the knowledge necessary to carry out vital student affairs actions, such as starting a club, applying for a budget/grant, or creating an event. This portal would grant students access to those specific types of questions, relieving the burden placed on student affairs administration. The club registration process, budget request, event request form, and student eligibility will all become automated. The system also allows students to see where their paperwork is in terms of workflow. Thus, the system will reduce the level of runaround and improve customer service.

As the portal contains viable information necessary for students and student clubs to function properly, the burden will be alleviated for student government to get that information out to over 16,000 students on campus. Student government will also be able to easily communicate and reach out to clubs to facilitate a cohesive environment. In addition, processes such as starting a club or applying for grants will greatly be facilitated through the implementation of this program. The portal will also allow students to easily view the progress and initiatives that student government continues to have.

In our research we have learned that the College of Staten Island and Lehman College are already using this tool. John Jay recently acquired the tool, and Queens College is also interested in acquiring the tool. Based on conversations with the student government at CSI, they highly recommend it. A campus demonstration was done with representatives from student government, Student Activities, and ITS and in comparison with other products, it was decided that this product would best suit the needs of Brooklyn College.

If funding is requested for a lab, other public access technology facility, of other physical facility:

- a. How many hours per week the lab will be open:**

- b. Who will supervise the facility and how will that be funded ongoing:**

- c. What physical space will be used to host the facility, and who has authorized its use:**

- d. If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

While the portal stands to benefit student government in a myriad of ways, it affects the entire student body as a whole. If the portal is in place, the non-active student gains access to the club scene on campus, facilitating his or her transition to becoming an active student. All clubs, as a whole, will gain as well, as their actions can be recorded and displayed to all students, increasing their membership. As student affairs actions are clearly delineated in the portal, students in all clubs and those seeking to start one will be able to do so in a much more efficient and expedient manner. Thus, this tool will serve all students, both undergraduate and graduate.

How will projected outcomes be assessed?

The impact of this tool will be assessed based on student use. Analytics within the system will be able to calculate the percentage of the total student population that is using it. Additionally, like our counterparts at CSI, we will create a survey to assess the usefulness of the tool by its users.

CollegiateLink Pricing for Brooklyn College

Cost quote prepared 11/12/2014. Pricing will expire after 90 days.

Base license	\$17,717
+1 Module (not Curriculums)	\$19,966
+2 Module (not Curriculums)	\$22,216
+Curriculums Module	\$4,160
Enterprise license	\$25,421

A base license includes:

- Authentication
- Administrative Messaging
- Campus Authentication Integration
- Card Swipe Attendance Tracking
- Co-Curricular Transcript Tool
- Community User Directory
- Custom Form Builder
- Data Export Tool
- Document Management Tools
- Event Management Tools
- Google Calendar Integration
- Involvement Import Tool
- Learning Outcome Tools
- News Articles and Ticker
- Organization Election Tools
- Organization Registration Tools
- Participation in Webinar Series and Custom Webinars
- Photo Galleries
- Remote Involvement Consultation, Technical Support & User Training
- Service Hours
- Social Media (Facebook/Twitter) Integration
- Text Messaging (SMS)
- Vanity URL
- Virtual Flyer-Board

Additional Modules Available:

- Campus-wide Election Tools
Run elections for student government, class councils, or other wide-scale polls. Restrict ballots by class year, school of enrollment, or any custom segments.
- Curriculums
Automate the tracking of student progress across curriculums, task assignments, or student affairs initiatives such as leadership certifications, passport programs, first-year experiences, or even campus-wide experience programs.
- Finance and Budgeting Tools
Streamline student government or activities fee allocation processes with an accounting system for approval-based funding and purchase requests. Provides an alternative for students to see balances outside the institution's financial system.
- Data Integration Tools
Extract user, organization, or event data from your system in real-time or batch import data such as SIS demographics or EMS locations/availability on a daily basis. Allows for integrating CollegiateLink with other campus applications. Access to web services API and automated FTP data transfer.

Enterprise License: Includes all 4 modules and **one-day on-site implementation & training visit.** Additional days for the On-Campus Visit may be added for \$1,000.00 per day plus travel.

*A one-time implementation fee of 25% is charged in year 1

Discounts can be available when purchasing additional Campus Labs products simultaneously. Please see <http://www.campuslabs.com/products/> for more information about assessment, retention/early-alert, and student success tools.

Student Technology Fee Proposal #2015-63

WIFI Support Coordinator

Department/Office: ITS
Applicant Name: Gold, Mark
Additional Applicant(s):
Primary Contact for Proposal
Email Address: MARK@BROOKLYN.CUNY.EDU
Phone: 718-951-5861
Estimated total cost: \$ 93,000.00

Description of Proposed Project:

ITS proposed creating a new STF funded position of WIFI Support Coordinator, who will have primary responsibility for monitoring and adjusting the WIFI infrastructure, evaluating and testing equipment seeking WIFI connections, and assisting users with WIFI connection issues. This allocation would be a recurring expenses ongoing.

ITS currently has no dedicated support staff dealing with WIFI issues. The increasing burden of supporting WIFI has drawn away scarce time and resources from other network management needs, and is not nearly meeting the demand for timely assistance to WIFI users.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

BC-WIFI is and will continue to be a critical resource for the campus community. It is a health and safety resource that permits rapid communication with community members. It is used in instruction in a variety of ways. It is the way most students access the college's extensive suite of online tools and resources.

If funding is requested for a lab, other public access technology facility, of other physical facility:

- a. **How many hours per week the lab will be open:**
- b. **Who will supervise the facility and how will that be funded ongoing:**
- c. **What physical space will be used to host the facility, and who has authorized its use:**
- d. **If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

All

How will projected outcomes be assessed?

User feedback. Performance monitoring.

BC WIFI Support

With the expansion of BC-WiFi to provide ubiquitous coverage throughout all buildings and campus spaces, the volume of support calls has increased dramatically. This is not only a function of the number of students, faculty, and staff who use the system and need problems addressed, but also the need to constantly monitor and tweak a system that has over 200 nodes spanning 12+ buildings on a 25 acre campus, and which is used 7 days each week for as much as 16 hours each day.

The BYOD (Bring Your Own Device) paradigm itself raises the bar on the amount of support that must be provided. Users bring devices to campus that must be configured in specific ways, and are not always compatible with BC's WiFi systems. Aside from the 4-5 thousand new devices that are provisioned each year, users regularly need to have their settings corrected or put back to spec in order to properly access BC-WiFi.

And yet, BC-WiFi is and will continue to be a critical resource for the campus community. It is a health and safety resource that permits rapid communication with community members. It is used in instruction in a variety of ways. It is the way most students access the college's extensive suite of online tools and resources.

Building infrastructure is certainly a requirement to implement useful WiFi, but without an appropriate level of technical support to deal with the users' needs, the resource cannot be successful.

ITS currently has no dedicated support staff dealing with WiFi issues. The increasing burden of supporting WiFi has drawn away scarce time and resources from other network management needs, and is not nearly meeting the demand for timely assistance to WiFi users.

ITS proposed creating a new STF funded position of WiFi Support Coordinator, who will have primary responsibility for monitoring and adjusting the WiFi infrastructure, evaluating and testing equipment seeking WiFi connections, and assisting users with WiFi connection issues. This allocation would be a recurring expense ongoing.

Coverage

In January 2008, BC had 99 WIFI nodes around the campus, mostly in public spaces, large labs, the Library, and outdoor areas. Today, that coverage has increased to around 200 nodes spanning all buildings. Specialized areas are now being backfilled (Whitman basement, SUBO, and TV Center).

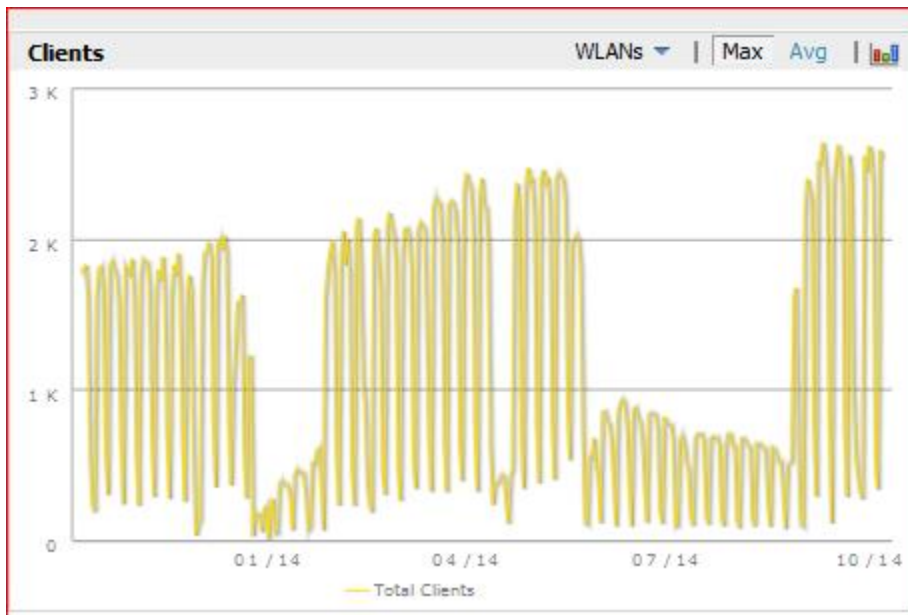
Student and faculty feedback about areas of congestion or dead spots are used to upgrade or extend the coverage.

Usage

Our systems show that WIFI peak usage has increased from under 2,000 simultaneous sessions in January of this year to around 2,500 simultaneous sessions now – see chart below. ITS configures around 4,000 new user devices to connect to BC WIFI each year at two campus locations and published online instructions for self-starters. There are probably 15-20,000 student, faculty, and staff devices that have been configured to access BC WIFI.

Continued Improvements

1. Older WIFI nodes are being replaced with newer models that can handle more users and cover more WIFI frequencies
2. Additional nodes are being added to high congestion areas
3. Guest management systems are being evaluated to more quickly provide access to short-term and long-term campus guests



Student Technology Fee Proposal #2015-65

WIFI Guest Management

Department/Office: ITS
Applicant Name: Gold, Mark
Additional Applicant(s):
Primary Contact for Proposal
Email Address: MARK@BROOKLYN.CUNY.EDU
Phone: 718-951-5861
Estimated total cost: \$ 35,000.00

Description of Proposed Project:

BC WIFI is available to campus community members who have BC email credentials. However "guests" or people who have not yet received their credentials regularly arrive on campus and request access to WIFI. They include students from other CUNY campuses, BC alumni, participants in student events, performers, and many more. These require direct intervention by specific ITS network experts and makes the process very difficult and often unable to respond quickly enough to meet the needs.

ITS proposes to procure a WIFI Guest Management System, which would streamline the process and facilitate distributing the ability to provide temporary WIFI access to trusted agents such as SUBO, Library, Lab Managers, and Event Coordinators.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

Enable the college to quickly and securely accommodate campus guests access to BC-WIFI thereby facilitating alumni visits, guest events, cross campus access, etc...I

If funding is requested for a lab, other public access technology facility, of other physical facility:

- a. **How many hours per week the lab will be open:**
- b. **Who will supervise the facility and how will that be funded ongoing:**
- c. **What physical space will be used to host the facility, and who has authorized its use:**
- d. **If any renovations or furnishings will be required to support the project, how will they be funded?**

Please describe how many students will be served each term through the funding of this project, and through what means:

ITS projects that the system will facilitate the accommodation of approximately 1,000 guests each year

How will projected outcomes be assessed?

Effectiveness monitoring

Student Technology Fee Proposal #2015-37
STF 2014 WTA Upgrade

Department/Office: Library
Applicant Name: Spivak, Howard
Additional Applicant(s): Rudshiteyn, Alex
Primary Contact for Proposal
Email Address: HOWARDS@BROOKLYN.CUNY.EDU
Phone: x5342
Estimated total cost: \$ 50,000.00

Description of Proposed Project:

We are requesting funding for a new video projector for the Woody Tanger Auditorium. In the past year, the entire control system of auditorium of the WTA failed and had to be replaced and reprogrammed. The system was over 15 years old and most replacement parts were no longer obtainable.

The current projection system consists of 3 projectors. Two of the projectors focus on the left and right sides of the screen. These are used primarily for PowerPoint presentations under conditions of very dim lighting where note taking is difficult. However we feel that this condition is acceptable for the present.

The most pressing need is to upgrade the primary middle projector whose major purpose is film presentation. The projector is not capable of Blu-Ray or HD projection. In addition, viewing is possible only under conditions of extreme darkness making note-taking extremely difficult. In addition to the projector, we are asking for fabric replacement of the projection screen which has become worn and damaged over the years.

Note: cost estimate source - Anil Lilly - includes projector (\$44,000) fabric, mounting bracket and labor.

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

This is not a Library proposal; it is a campus proposal. The WTA is used by the entire campus.

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

72

b. Who will supervise the facility and how will that be funded ongoing:

Library and New Media staff will supervise.

c. What physical space will be used to host the facility, and who has authorized its use:

Library. Usage requested on line and approved by New Media Center

d. If any renovations or furnishings will be required to support the project, how will they be funded?

Not applicable ? projector cannot be considered furniture, it is technology.

Please describe how many students will be served each term through the funding of this project, and through what means:

Potentially all BC students, faculty, and staff will benefit, as virtually everyone uses the WTA at some point.

How will projected outcomes be assessed?

When HD and Blu-ray films can be viewed by students we will label the project a success

Student Technology Fee Proposal #2015-39
Student Laptop Loan Program restoration

Department/Office: Library
Applicant Name: Spivak, Howard
Additional Applicant(s): Walker, Stephanie
Primary Contact for Proposal
Email Address: HOWARDS@BROOKLYN.CUNY.EDU
Phone: x5342
Estimated total cost: \$ 51,500.00

Description of Proposed Project:

Restore the number of laptops in the College Student Laptop Loan program to approximately 175.

Currently (11/20/2014) there are only 112 working laptops available for loan. (see attachment for a description of the condition of laptops in the program).

The student laptop loan program has been increasing in popularity. Especially popular are MacBook Pros and the lite-weight model Dells.

Total usage for period covering August 27 2013- August 27 2014
5984 same day loans
1923 3 - day loans
199 30 - day loans
128 Custom loans

The entire student body (approx. 19,000 students) could benefit from this project. The Library is an important and popular student computing and work area. The number of laptops loaned has grown significantly (see above). Undergraduates can borrow laptops for a 1 day or 3 day period. Graduate students can borrow laptops for a 30 day period.

The popularity of the Library as a technological work center has often resulted in long lines waiting for a computer during the peak hours of the day, and during the midterm and finals periods of the semester. The availability of laptops help to alleviate the problem by making more computers available reducing congestion and competition for a workstation.

The program is requesting 30 new MacBook Pros; 20 Dell laptops and replacement parts.

Macbook Pro \$37,400
Replacement parts \$750
Dell laptops 13,400

Total \$51,550

How will this request have a direct impact on student learning or student life?

What are the objectives of this project?

Provide computing access to students who do not own a personal computer.
Reduce the long lines waiting for a computer during the peak hours of the day, and during the midterm and finals periods of the semester

If funding is requested for a lab, other public access technology facility, of other physical facility:

a. How many hours per week the lab will be open:

72

b. Who will supervise the facility and how will that be funded ongoing:

New Media Center staff

c. What physical space will be used to host the facility, and who has authorized its use:

New Media Center - 2nd floor Library

d. If any renovations or furnishings will be required to support the project, how will they be funded?

Please describe how many students will be served each term through the funding of this project, and through what means:

The entire student body (approx. 19,000 students) could benefit from this project.

How will projected outcomes be assessed?

increased borrowing.

MODEL	AMOUNT	Missing Charger	Dead Battery	Nonfunctional touchpad	Damaged Keyboard	Damaged In Systems for maintenance	Lost	Physical damage to housing
iPad	5	-	-	-	-	-	-	-
Latitude 2100	26	6	1	-	-	-	2	2
Latitude D600	0	0	0	-	-	-	-	-
Latitude D610	10	0	0	-	-	-	-	-
Latitude E5430	33	2	1	4	2	2		
Latitude E6400	19	0	0	-	-	3	-	-
Latitude E6410	29	7	1	-	2	1	1	1
MacBook Air 11"	10	0	-	-	-	-	-	-
MacBook Pro 13"	13	2	-	-	-	-	-	-
MacBook Pro 7.1	9	0	-	-	-	1	1	-
TOTAL	154	17	3	4	4	7	4	3

Additionally 4 2100; 15 600; 13 610; and 3 6400 were salvaged for parts.

Cost of replacement parts

Dell e6400 touchpad	\$ 12.95	4	\$ 51.80
Generic 160 GB 160GB 2.5 Inch Sata Laptop Internal Hard drive	\$ 19.48	5	\$ 97.40
Dell 19.5V 4.62A 90W PA-3E Slim AC Adapter	\$ 35.88	10	\$ 358.80
Dell Latitude E6400 E6500, Precision M2400 M4400 Laptop Keyboard	\$ 21.98	2	\$ 43.96
Dell Latitude E5430 Palmrest Touchpad Assembly	\$ 28.00	2	\$ 56.00
Laptop replacement keyboard for Dell Latitude E5430 E6230 E6330 E6430	\$ 20.98	1	\$ 20.98
LB1 High Performance Battery for Apple Macbook Pro 13 inch A1278 A1322	\$ 54.95	2	\$ 109.90
			\$ 738.84



QUOTATION

Quote #: 695748408
Customer #: 21694350
Contract #: 44ADD
Customer Agreement #: PT65340
Quote Date: 11/20/2014
Date: 11/20/2014 **Customer Name:** BROOKLYN COLLEGE

Thanks for choosing Dell! Your quote is detailed below; please review the quote for product and informational accuracy. If you find errors or desire certain changes please contact your sales professional as soon as possible.

Sales Professional Information

SALES REP:	MICHAEL CARLSON	PHONE:	1800 - 4563355
Email Address:	Michael_Carlson@Dell.com	Phone Ext:	513-9427

GROUP: 1 QUANTITY: 20 SYSTEM PRICE: \$670.80 GROUP TOTAL: \$13,416.00	
Description	Quantity
Dell Latitude 3340 (210-ABYW)	20
8GB (2x4GB) 1600MHz DDR3L Memory (370-AAQJ)	20
Internal English Keyboard (580-ABXF)	20
Intel Integrated HD Graphics 4400 (490-BBST)	20
Dell Wireless 1707 Driver (555-BBSY)	20
250GB (7.200 Rpm) Serial ATA Hard Drive (400-AEKE)	20
Ubuntu 12.04 Long Term Support (LTS) SP1 (619-AAET)	20
US Order (332-1286)	20
Primary 6-cell 65W/HR Battery (451-BBII)	20
No Wireless WAN Card (362-BBBB)	20
No Carrying Case (460-BBEX)	20
Dell Wireless 1707 802.11n Single Band + Bluetooth 4.0 LE Half Mini Card (555-BBRT)	20
E5 Power Cord (US) (537-BBBD)	20
No Media (620-AAOH)	20
No Dell Backup and Recovery software (637-AAAM)	20
BTO Standard Shipment (S) (800-BBGT)	20
Safety/Environment and Regulatory Guide (English/French/Dutch) (340-AGIK)	20
No Camera Software (319-BBBK)	20
Basic Hardware Service: Next Business Day Limited Onsite Service After Remote Diagnosis 2 Year Extended (966-2943)	20
Basic Hardware Service: Next Business Day Limited Onsite Service After Remote Diagnosis Initial Year (966-2949)	20
Dell Limited Hardware Warranty Plus Service Extended Year(s) (966-3020)	20
Dell Limited Hardware Warranty Plus Service Initial Year (966-3022)	20
No Resource DVD (430-XXYG)	20
Quick Start Guide (340-AIIC)	20
No Energy Star (387-BBCE)	20
4th Gen Intel Core i3-4005U Processor (1.7 GHz, 3MB Cache, Dual Core) (338-BDWP)	20
No DDPE Encryption Software (954-3465)	20

Direct Ship Info Mod (340-AASO)	20
SHIP SHUTTLE (340-AIHZ)	20
SHIP MIN-CONFIG (340-AIIB)	20
SHIP MATERIAL SHUTTLE (340-AIIE)	20
SHIP MATERIAL (340-AIIF)	20
Thank you for Choosing Dell (340-AIIK)	20
LCD Back Cover for 3340, BLACK (320-BBGT)	20
No Intel Responsive (551-BBBJ)	20
Intel Core i3 Processor Label (389-BCCH)	20
33.8cm (13.3") HD (1366x768) LED-backlit Non-Touch LCD Panel (391-BBMV)	20
No Productivity Software,Dell OptiPlex,Precision and Latitude (421-3872)	20
ODM Info (640-BBJB)	20
Software for Latitude 3340 (640-BBMX)	20
No Security Software (650-AAHI)	20
65W AC Adapter, 3-pin (492-BBEM)	20

*Total Purchase Price:	\$13,416.00
Product Subtotal:	\$13,416.00
Tax:	\$0.00
Shipping & Handling:	\$0.00
State Environmental Fee:	\$0.00
Shipping Method:	LTl 5 DAY OR LESS

(* Amount denoted in \$)

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(www.dell.com/AEULA) and use of the Dell-branded system software is subject to the Dell End User License Agreement - Type S (www.dell.com/SEULA).

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Proposal 2101544526

Proposer: Alex Rudshteyn

Thank you for your proposal dated 11/20/2014. The details we've provided below are based on the terms assigned to account 99832, CUNY-BROOKLYN COLLEGE.

To access this proposal online, please search by referencing proposal number 2101544526.

Comments from Proposer:
30 MAC laptops for NMC

Part Number	Description	Total Quantity	Unit Price	Total Price
Z0MT	MacBook Pro 13-inch	30	1,089.00	32,670.00 USD
	2.5GHz Dual-core Intel Core i5, Turbo Boost up to 3.1GHz		Promotion Savings	-750.00 USD
	8GB 1600MHz DDR3 SDRAM - 2x4GB			
	500GB Serial ATA Drive @ 5400 rpm			
	SuperDrive 8x (DVD±R DL/DVD±RW/CD-RW)			
	Backlit Keyboard (English) / User's Guide (English)			
S3130LL/A	AppleCare Protection Plan - 11-inch and 13-inch MacBook Air/	30	183.00	5,490.00 USD
Subtotal				37,410.00 USD
Estimated Tax				0.00 USD
Total				37,410.00 USD

Please note that your order subtotal does not include Sales tax or rebates. Sales tax and rebates, if applicable, will be added when your order is processed.

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