

Core Facilities Annual Report FY2013

Dr. Charles Delwiche and Amy Beaven

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Executive Summary

The Imaging Core's (IC) two confocal microscopes, a Leica SP5X and a Zeiss LSM710, saw a combined average usage of 41.8 hours per week in FY13, which is a 3.8% decrease from the previous year. The Zeiss was used 315 more hours than the Leica in FY13 (1248 hours vs. 932 hours, respectively). One goal of the IC in the coming year will be to increase use of the Leica by encouraging researchers to take advantage of the microscope's unique capabilities, including a motorized stage, white light laser, high speed scanner and environmental chamber.

From FY09 through the end of FY13, 304 different researchers were trained to independently operate the two confocal microscopes, including students taking the 2-credit course, BSCI427/CBMG688W, Principles of Microscopy. Use of the two microscopes has already resulted in 48 publications, bringing the total number of publications made possible through the use of the IC's current and previous microscopes to at least 94 (detailed below, under "Publications").

In FY13, consumable and service contract expenses exceeded the total income collected via charge-backs by \$3,862. Based on the previous year's projections, the IC expected to lose over \$12,500 in FY13. The difference in the projected versus actual loss is mostly due to the Director's successful negotiations with Leica to lower the cost of the SP5X service contract by \$30,408 for the 2 year period from 12/23/12 through 12/23/14. The Director also negotiated a copyright agreement between Leica and UMD's legal office that allows the IC's UMD QuickStart Guide to be used as an official (open source) Leica publication. In exchange, Leica upgraded the SP5X confocal with new reflection-suppression notch filters (value of \$13,915) at no cost.

The IC implemented a new variable rate system in FY13, where "peak" times (M-F, 8am-6pm, weekends/holidays) were charged at a rate of \$26.00/hr and "off-peak times" (all other times) were charged at \$23.00/hr. A total of 19.7% of Zeiss users and 21.9% of Leica users took advantage of the lower, off-peak rates.

Beginning in FY13, the IC will no longer receive temporary subsidies associated with the acquisition of the two new confocal microscopes. In anticipation of this loss, the IC began incrementally increasing user fees beginning in FY10, and projected that a 7% annual increase in rates through FY20 would be necessary for the facility to remain self-sustaining (i.e. be able to cover the cost of maintenance and service contracts through user fees alone). However, due to the unexpected drop in the service contract price for the Leica SP5X, the IC feels no rate increase will be necessary in FY14. The current rate of \$26.00/hr (peak) is still well below the average rate of \$32.50 (Table 13) charged at similar institutions with equivalent instrumentation.

It is worth noting that, while the Director's salary is paid for entirely by CBMG, members of the department accounted for only 2% of sequencer usage and less than 50% of confocal usage in FY13.

Introduction

Established in the year 2000 by the Department of Cell Biology and Molecular Genetics, the Imaging Core (IC) was designed to enhance research and education at the University by providing students and faculty with access to sophisticated light microscopes and imaging instrumentation whose purchase and maintenance costs far exceed the budgets of individual investigators. Serving as the primary resource for advanced light microscopy in the Biological Sciences at the University of Maryland, the IC carries the mission of providing state of the art light microscopy instrumentation, training users in basic and advanced light microscopy techniques and introducing the latest technology and innovations in light microscopy.

Located in room 0107 Microbiology Building, the IC facility contains 9 rooms, five of which are dedicated microscope space, a working darkroom, office space for the Director and a wet-bench lab space with fume hood. When first established, the IC contained a single confocal microscope and a deconvolution microscope. Over the years, demand for time on the instruments increased dramatically, necessitating the purchase of a second confocal in 2008. At present, the IC contains 2 state-of-the-art confocal microscopes, a deconvolution microscope, 2 fluorescence microscopes and an automatic film processor.

The Director of the IC, Amy Beaven, oversees the routine operation of the laboratory and is available during normal business hours to provide training on all equipment, guidance on experimental design, assistance with image analysis and technician-assisted microscope operation. Since taking over the IC operation in November 2005, Ms. Beaven has trained over 456 researchers from at least ten different departments in six colleges and three different campuses of the University of Maryland.

The IC is used by a diverse group of investigators, including undergraduates, graduate students, post-docs, technicians and faculty. Students enrolled in the annual 2-credit class CBMG688W/BSCI427, Principles of Microscopy, gain hands-on experience in the operation of the IC's fluorescence and Leica SP5X confocal microscope. This course has trained an average of fifteen students each year for the past ten years.

In the past, funding for the IC came from a combination of user fees and support from the University of Maryland. In an effort to become self-sustaining, trends in facility income, expenses and instrument usage were analyzed over time (the details of which are published in IC's FY10-13 Annual Reports). The analysis showed that a gradual increase in hourly instrument rates would be necessary in order for the facility to become financially independent. As such, user fees were incrementally increased over several years and, beginning in FY13, the IC expects to cover all maintenance and service contract costs through user fees alone, with no additional subsidies required from the University (other than the Director's salary, which is paid for by CBMG). Current instrument fees are priced competitively and still well below the average rates charged at similar institutions with equivalent instrumentation.

Facility Mission

The mission of the Imaging Core Facility, located in 0107 Microbiology Building, is to enhance research and education within the College by:

- Providing access to state-of-the-art light microscopy and imaging instrumentation.
- Offering detailed training opportunities and support in basic and advanced light microscopy techniques.
- Keeping researchers up to date with the latest technology and innovations in light microscopy.

Organizational Structure and Governance

- Director of the Facility: Amy Beaven
- Faculty supervisor: Dr. Charles Delwiche, Professor
- Advisory Committee: Dr. Charles Delwiche, Professor (CBMG) Dr. Ricardo Araneda, Assistant Professor (BIOL), Dr. Stephen Wolniak, Professor (CBMG), Dr. Antony Jose, Assistant Professor (CBMG)

Personnel

The Director of the Facility, Amy Beaven, is the only full-time staff member within the facility. She was hired in 2005 to manage the Imaging and Genomics Core facilities and was promoted to Director in 2010. Ms. Beaven received her Master's degree in Biology in 1999 and has over 11 years intensive experience in confocal imaging techniques. She is available during the hours of 8am-4:30pm to provide guidance in experimental design, training on all equipment, technician-assisted confocal operation and assistance with image analysis.

History of the Facility

Amy Beaven was hired to manage the Imaging Core Facility in November 2005. She took over for the previous director of the facility, Dr. Robert Brown, who had left the University several months previously. At this time, the facility contained both Imaging and Genomics related equipment. Instrumentation included a Zeiss LSM 510 confocal microscope (0107E), a DeltaVision deconvolution microscope (0107F), an Olympus fluorescence microscope (0107), a Bio-Rad FX Pro Plus Imager, a Konica film processor (0107A), an ABI 3730xl DNA sequencer (0107H), two ABI 3100 DNA Sequencers (0107H) and an ABI 7700 Sequence Detector Real-Time PCR machine (0107H).

Summary of changes in instrumentation since November 2005

- August 2006: A Mini Med 90 Film Processor (cost: \$3,588.00) replaced the old Konica processor. The department paid \$2,500.00 of the total cost and each of the following PIs contributed \$109: Jonathan Dinman, Jeffrey DeStefano, Kenneth Frauwirth, David Mosser, Anne Simon, Wenxia Song, Richard Stewart and Elizabeth Gantt. The developer is serviced monthly by United Medical.
- October 2006: Dr. Steve Wolniak (Interim Chair of CBMG) procured a Zeiss Axiophot fluorescence microscope for the facility following Dr. Ron Weiner's retirement. A CoolSnap EZ monochrome camera, computer workstation and Nikon Elements software (total cost: \$13,400.00) were purchased in 2007 for the microscope using CBMG funds.
- April 2007: The 7700 Sequencer Detector was replaced with a Roche LightCycler 480 Real-Time PCR machine, which was purchased through CBMG using the Bioscience Research Building capital equipment funds (and is housed in BRB; see below).
- August 2007: Due to a drop in usage, the 3100 "North" DNA sequencer was taken out of operation.
- December 2008: The instruments in 0107H MICB (two ABI 3100 DNA sequencers, the ABI 3730xl DNA Sequencer and the Roche LightCycler 480 Real-Time PCR machines) were moved to the new Genomics Core, room 2229 Bioscience Research Building.
- December 2008: The Leica SP5 X confocal microscope was installed in room 0107H MICB. This microscope was obtained by Drs. Ian Mather and Steve Wolniak via an NSF grant.
- October 2009: The LSM510 confocal microscope was dismantled to make way for the new LSM710 confocal microscope. This microscope was purchased using College Funds, authorized by Dean Norma Allewell.
- January 2009: Genomics Core Equipment: Bio-Rad CFX 96 Real-time PCR machine was purchased and placed in room 2229 BRB.
- April 2010: Genomics Core Equipment: Due to a drop in usage, the 3100 "West" DNA sequencer was taken out of operation.
- September 2010: Dr. Charles Delwiche donated a Napco CO2 incubator to the Imaging Core.
- July 2011: Genomics Core Equipment: July 2011: Both the 3100 "West" and 3100 "North" DNA sequencers were sold through Terrapin Trader.
- November 2011: A Thermo Scientific Midi 40 CO2 incubator was purchased using Imaging Core funds (\$3,194.00)

Table 1: Current Imaging Core Equipment

Equipment	Location	Description	Purchase Date	In-College Rate History (Academic Year)
Zeiss LSM 710 Confocal Microscope	0107E MICB	405 diode, argon (458, 488, 514nm), 561, 633. 3 PMTs, manual stage	October 2009	2009/2010: \$15.00/hr 2010/2011: \$18.60/hr 2011/2012: \$22.00/hr 2012/2013: \$26.00/hr Peak 2012/2013: \$23.00/hr Off-Peak
Leica SP5X Confocal Microscope	0107H MICB	405 diode, argon (458, 488, 514), WLL. 5 PMTs, automated stage, resonance scanner, environmental chamber	December 2008	2008/2009: \$15.00/hr 2009/2010: \$15.75/hr 2010/2011: \$18.60/hr 2011/2012: \$22.00/hr 2012/2013: \$26.00/hr Peak 2012/2013: \$23.00/hr Off-Peak
Deltavision Deconvolution Microscope	0107F MICB	Standard DAPI, FITC, TRITC filters, automated stage	1999	2008/2009: \$8.00/hr 2009/2010: \$8.00/hr 2010/2011: \$8.00/hr 2011/2013: \$8.00/hr 2012/2013: \$8.00/hr
Axiophot Fluorescence Microscope	0107G MICB	Standard DAPI, FITC, TRITC filters, CoolSnap monochrome camera, workstation with Nikon Elements	CoolSnap, Elements: July 2007	\$2.00/hr since purchase
Olympus Fluorescence Microscope	0107 MICB	Standard DAPI, FITC, Rhodamine filters	Unknown	\$2.00/hr since 2005
Mini Med 90 Film Processor	0107A MICB	Standard film processor	August 2006	\$0.00/hr since purchase
Thermo Scientific Midi 40	0107L MICB	CO2 incubator	November 2011	\$0.00/hr since purchase

Table 2: Current Genomics Core Equipment

Equipment	Location	Description	Purchase Date	In-College Rate History (Academic Year)
3730xl DNA Sequencer	2229 BRB	96 capillary DNA sequencer	June 2004	2005/2006: \$25.00/run 2006/2007: \$35.00/ run 2007/2008: \$35.00/ run 2008/2009: \$37.00/ run 2009/2010: \$38.00/ run 2010/2011: \$38.00/ run 2011/2012: \$38.00/ run 2012/2013: \$39.00/run
Roche LightCycler 480 qPCR	2229 BRB	96 and 384 well real-time PCR machine	April 2007	2007/2008: \$7.00/hr 2008/2009: \$7.50/hr 2009/2010: \$8.00/hr 2010/2011: \$8.50/hr 2011/2012: \$8.50/hr 2012/2013: \$9.00/hr
Bio-Rad CFX96 qPCR	2229 BRB	96-well real-time PCR machine	January 2009	2009/2010: \$8.00/hr 2010/2011: \$8.50/hr 2011/2012: \$8.50/hr 2012/2013: \$9.00/hr

Summary of Facility Usage

During FY13, use of the Zeiss LSM710 averaged 23.9 hours per week and Leica SP5X use averaged 17.9 per week. The combined average usage of 41.8 hours per week is a decrease from previous years (43.4 hours per week in FY12 and 59.2 hour per week in FY11), with both microscopes seeing a decrease in the number of hours used.

Table 3: Leica SP5X Summary Data:

Fiscal Year	Income from User Fees	Total # Hours Used	Total hours used for UMCP courses	Total # Training Sessions
2009	\$5,090.75	345.78	0	39
2010	\$18,362.80	1282.517	70.96	43
2011	\$24,290.48	1325.3	55.5	35
2012	\$21,882.08	1021.25	62.75	29
2013	\$21,922.00	932.25	90.75	35
Total	\$91,548.11	4907.1	279.96	181

Table 4: Zeiss LSM710 Summary Data:

Fiscal Year	Income from User Fees	Total # Hours Used	Total hours used for UMCP courses	Total # Training Sessions
2010	\$12,370.13	803.675	0	44
2011	\$33,448.35	1762.25	0	33
2012	\$27,895.48	1244.00	0	20
2013	\$33,888.80	1247.75	0	26
Total	\$107,602.76	5057.675	0	123

Table 5: Combined Microscope Data:

Fiscal Year	Income from User Fees	Total # Hours Used	Total hours used for UMCP courses	Total # Training Sessions
2009	\$5,090.75	345.78	0.00	39
2010	\$30,732.93	2086.19	70.96	87
2011	\$57,738.83	3087.55	55.50	68
2012	\$49,777.56	2265.25	62.751	49
2013	\$55,810.80	21800.00	90.75	61
Total	\$199,150.87	9964.77	279.96	304

During FY13, 51 different laboratories from 10 different departments (AGNR, BioENGR, Biology, CBMG, Chem/Biochem, ENGR, ENT, Hearing/Speech, IBBR, Physics) and 1 off-campus laboratory (Origine) made use of the facility's confocal microscopes. CBMG accounted for 48% of the total microscope use (Figure 3). Please see the following page for more information about microscope use by PI and department.

Figure 1: Top Confocal Users by Department FY13

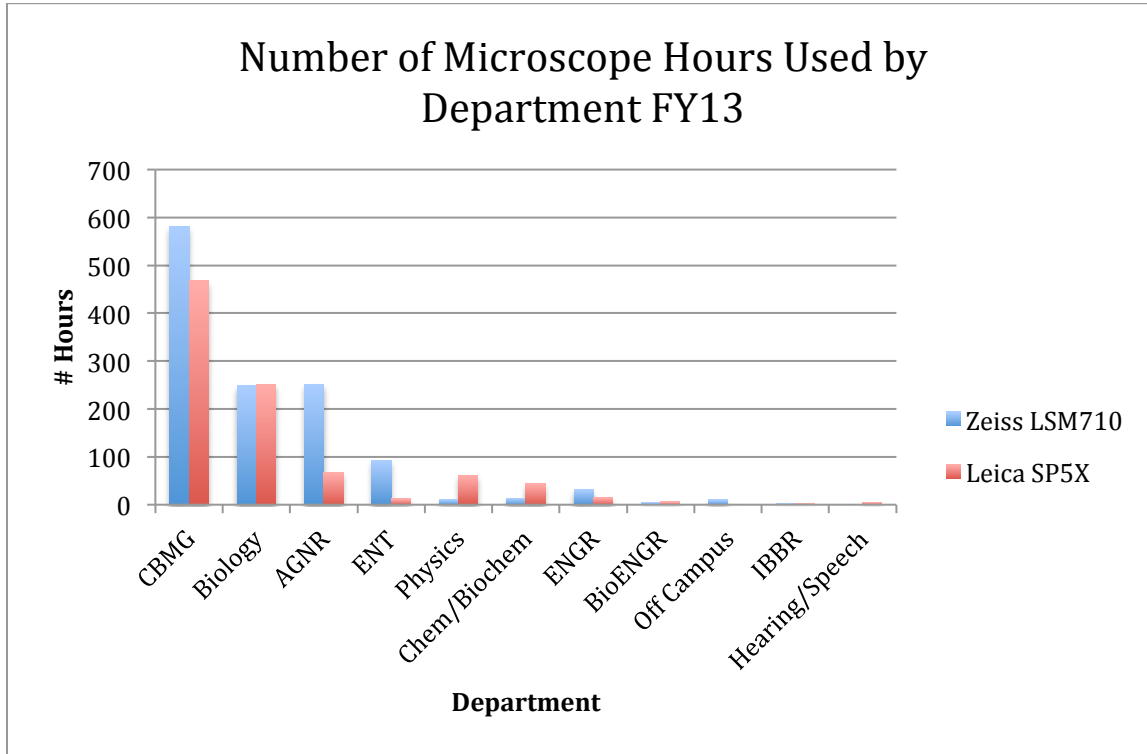


Figure 2: Top Confocal Users FY13

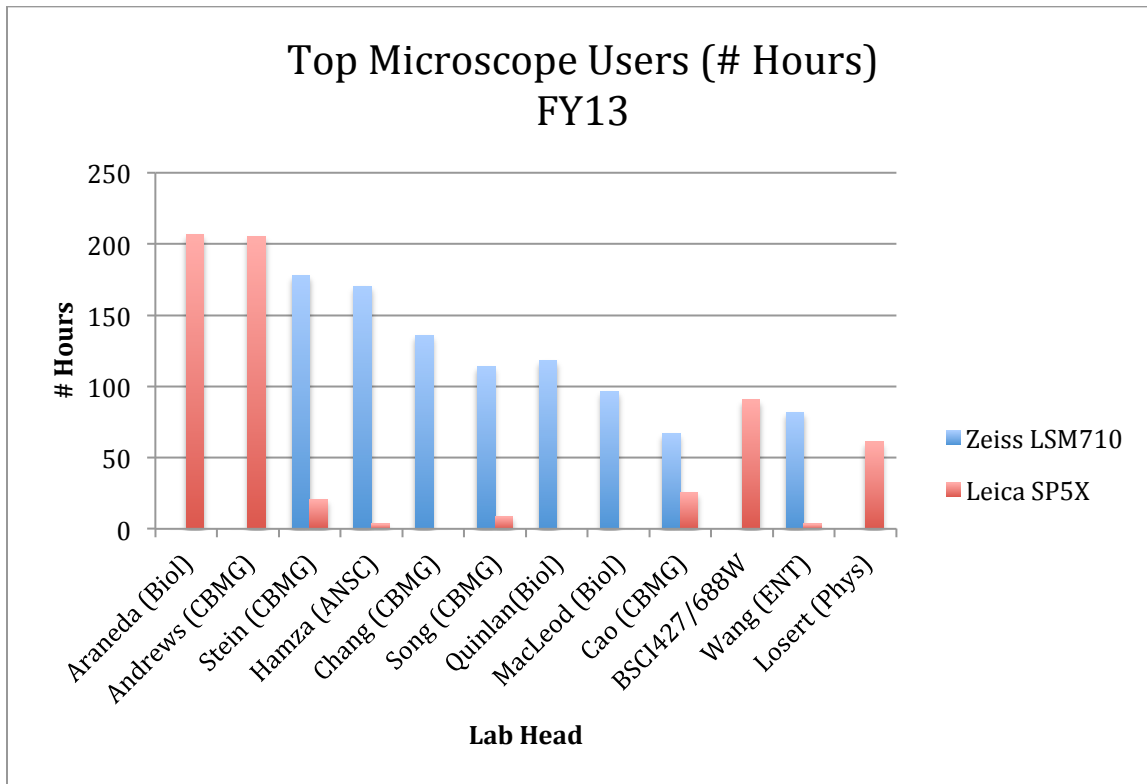
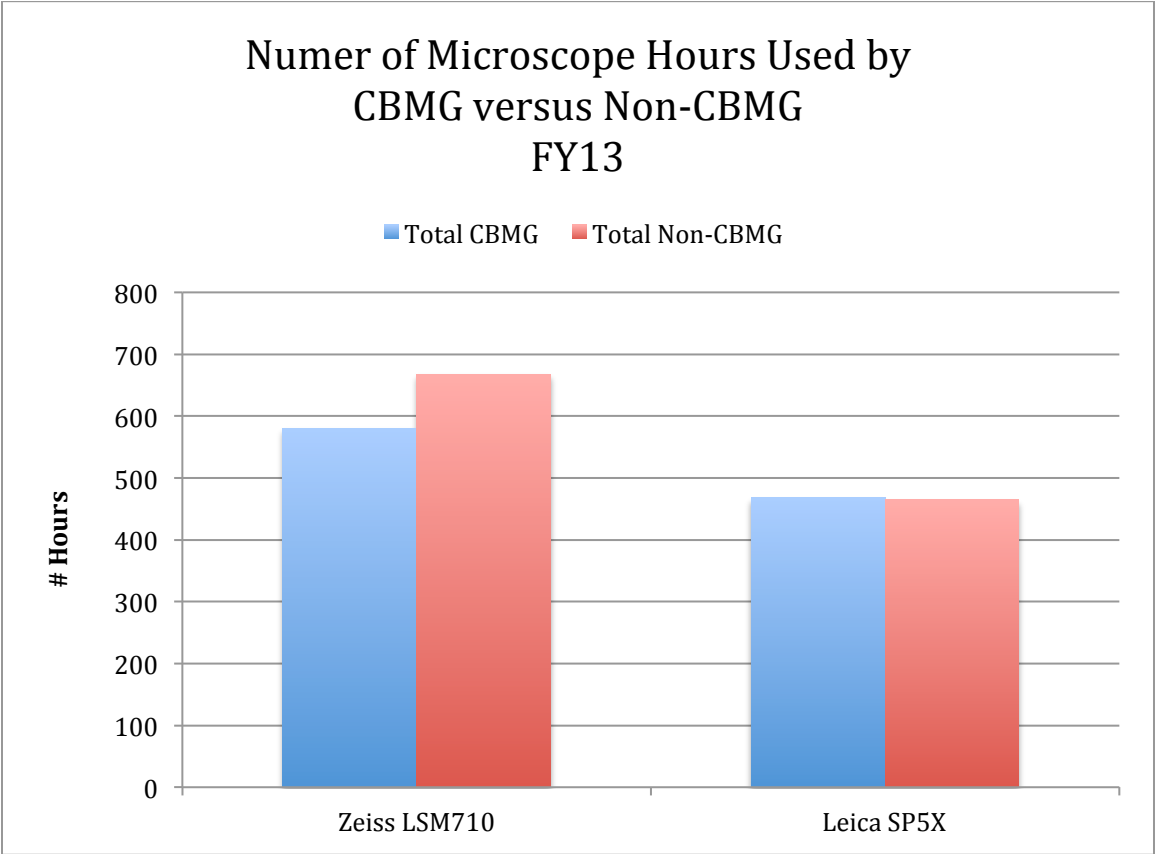


Figure 3: CBMG versus non-CBMG Use of Confocal Microscopes FY13



Publications

Publications that entailed the use of the Zeiss LSM 510:

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3. The MHC class II-associated invariant chain interacts with the neonatal Fc gamma receptor and modulates its trafficking to endosomal/lysosomal compartments. Ye L, Liu X, Rout SN, Li Z, Yan Y, Lu L, Kamala T, Nanda NK, Song W, Samal SK, Zhu X. *J Immunol.* 2008 Aug 15;181(4):2572-85
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5. Identification and characterization of an alternatively spliced variant of the MHC class I-related porcine neonatal Fc receptor for IgG.
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Publications that entailed the use of the Leica SP5 X (to date):

1. Sikes, J. M. and Bely, A. E. (2008), Radical modification of the A–P axis and the evolution of asexual reproduction in *Convolutriloba* acoels. *Evolution & Development*, 10: 619–631. doi: 10.1111/j.1525-142X.2008.00276.x
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5. Jammes, F., Song, C. J., D. Shin, Munemasa, S., Takeda, K., Gu, D., Cho, D. S., Lee, S., Giordo, R., Sritubtim, S., Leonhardt, N., Ellis, E. B., Murata, Y. and Kwak, J. M. (2009) Two MAP kinases,

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Outreach Activities During FY13

1. August 14-15, 2012: The Imaging Core hosted the Leica Live Cell Imaging Workshop. 39 people signed up to attend the seminars. Topics Included:
 - a. Basic Microscopy
 - b. Digital Imaging
 - c. Confocal Imaging
 - d. FRET Techniques with guest speaker Dr. Amansi Periasami of UVA
 - e. Advanced Confocal Imaging Techniques
2. August 22, 2012: The annual Imaging Core Users Meeting.
3. 2012 Fall Semester: Amy Beaven trained members of the class CBMG688W/BSCI472, Principles of Microscopy, to use the Axiophot fluorescence microscope and the Leica SP5X microscope.
4. 2012 Fall Semester: Amy Beaven assisted members of BSCI415 with the acquisition of confocal images.
5. March 11-17, 2013: Amy Beaven attended the 12th Annual FRET Microscopy Workshop at the W.M. Keck Center for Cellular Imaging, University of Virginia.

Operating Cost Analysis

Current Data

At the end of FY13, the Imaging Core account held a calculated surplus of \$84,214 (based on calculated total income and expenses since FY09). The balance will be used in the current fiscal year to pay for both confocal microscope service contracts, a total of \$56,351.50 (a decrease of \$15,204.50 from FY12).

Table 6: Total Imaging Core Facility Income and Expenses from FY09-FY13

Year	Total Income (including subsidies)	Total Imaging Core Expenses	Net Balance
FY2009	\$5,090.75	\$6,113.25	\$-(1,022.50)
FY2010	\$68,232.80	\$29,563.70	\$38,669.10
FY2011	\$95,238.48	\$55,524.75	\$39,713.73
FY2012	\$87,277.66	\$76,562.12	\$10,715.54
FY2013	\$55,810.80	\$59,672.67	\$-(3,861.87)
Total	\$311,650.49	\$227,436.49	\$84,214.00

Table 7: Cost Breakdown: Leica SP5X

Year	Service Contract Cost	Expenses	Income	Income (subsidies)	Income - Expenses
FY2009	0	\$6,113.25	\$5,090.75	0	\$-(1,022.55)
FY2010	\$26,000.00	\$2,375.80	\$18,362.80	\$37,500.00	\$27,487.00
FY2011	\$36,075.00	\$488.25	\$24,290.00	\$37,500.00	\$25,226.75
FY2012	\$52,296.00	\$2,055.56	\$21,882.08	\$37,500.00	\$5,030.52
FY2013	\$37,091.50	\$1,886.66	\$21,922.00	0	\$(-17,057.16)
Total	\$151,462.50	\$12,920.52	\$91,548.11	\$112,500.00	\$39,665.09

Table 8: Cost Breakdown: LSM 710

Year	Service Contract Cost	Expenses	Income	Income (subsidies)	Income - Expenses
FY2009	0	0	0	0	0
FY2010	0	\$1,187.90	\$12,370.00	0	\$11,182.10
FY2011	\$17,730.00	\$1,231.50	\$33,448.00	0	\$14,486.50
FY2012	\$19,260.00	\$2,950.56	\$27,895.58	0	\$5,685.02
FY2013	\$19,260.00	\$1,433.51	\$33,888.80	0	\$13,195.29
Total	\$56,250.00	\$6,803.47	\$107,602.38	0	\$44,548.91

It should be noted that the Leica SP5X confocal was heavily subsidized through FY12 (Table 7) by CBMG, VPR and IBBR. Those subsidies have now expired and user fees will need to cover the full cost of all expenses in future years.

Also note that the Leica SP5X service contract is much more costly than the Zeiss LSM710 contract (Tables 7 and 8) because it has several additional features, including an environmental chamber, high speed (resonance) scanner, white light laser and motorized stage.

Projected Cost Analysis:

Assuming rates, service contract costs and instrument usage remain unchanged; the Imaging Core will lose \$2,413.58 each year (Table 9), for an ending account balance in FY20 of \$67,323 (Table 10). These calculations do not take into account unexpected large expenses, such as the replacement of objective lenses.

Table 9: Yearly projected Income and Expenses: If Rates Remain Unchanged

Microscope	Projected Expenses (consumables & service contracts)	Projected Income	Income-Expenses
SP5X	\$38,979.00	\$22,768.38	\$-(16,210.63)
LSM710	\$20,693.00	\$34,490.05	\$13,797.05
Total	\$59,672.00	\$57,258.43	\$-(2,413.58)

Table 10: Projected Account Balance Through FY20: If Rates Remain Unchanged

Microscope	Projected Expenses (consumables & service contracts)	Projected Income	Income-Expenses
SP5X	\$272,853.00	\$159,378.63	\$-(113,474.38)
LSM710	\$144,851.00	\$241,430.35	\$96,579.35
Total	\$417,704.00	\$400,808.98	\$-(16,895.03)
Account Balance End of FY20: \$67,323			

Proposed Rate Schedule:

Beginning in FY14, the IC will no longer receive temporary subsidies associated with the acquisition of the two new confocal microscopes. In anticipation of this loss, the IC began incrementally increasing user fees beginning in FY10, and projected that a 7% annual increase in rates through FY20 would be necessary for the facility to remain self-sustaining (i.e. be able to cover the cost of maintenance and service contracts through user fees alone). However, due to the unexpected drop in the service contract price for the Leica SP5X, the IC feels no rate increase will be necessary in FY14

Table 11: Proposed rate schedule for unassisted use:

Academic Year	Users w/in CMNS & AGNR (excluding VetMed)	On-campus users not affiliated with CLFS	Users Not affiliated with campus
Current Rate	\$26/hr (peak) \$23/hr (off-peak)	\$39/hr	\$78/hr
2014/2015	\$26/hr (peak) \$23/hr (off-peak)	\$39/hr	\$78/hr
All future years	\$26/hr (peak) \$23/hr (off-peak)	\$39/hr	\$78/hr

Table 12: Proposed rate schedule for assisted use:

Academic Year	Users w/in CMNS & AGNR (excluding VetMed)	On-campus users not affiliated with CLFS	Users Not affiliated with campus
Current Year	\$50.00	\$60.00	\$180.00
All Future Years	\$50.00	\$60.00	\$180.00

A thorough examination of confocal microscope rates at other institutions indicates that the facility's microscopes are priced competitively. The average rate for similar confocal microscopes at 25 institutions was \$32.50/hour. For more details, please see Table 13 on the follow page.

Table 13: Example Confocal Rates (updated July 2013)

Facility	Instrument	Hourly Rate	Additional Information
Berkeley Biological Imaging Facility	Zeiss LSM710	\$36	Training \$137.50/user
	Zeiss LSM510	\$28	
Cornell U Life Sciences Imaging Core	Zeiss LSM710	\$30	Training \$125/user
	Zeiss LSM510	\$25	Training \$75/hr
	Leica SP2	\$20	Training \$100/user
University of Virginia School of Medicine	Zeiss LSM510	\$34-\$54	\$35/hr 25-42 hrs/month \$54/hr 1-5 hrs/month
Iowa State University Confocal Facility	Leica SP5 X	\$31	
Northwestern U Biological Imaging	Leica SP5	\$30	
	Zeiss LSM510	\$35	
Arizona State Imaging Facility	Zeiss LSM510	\$25	Training is \$46/hr
University of Illinois	Zeiss LSM700	\$28	Training \$41/hr
	Zeiss LSM710 MP	\$31	
Duke University Light Microscopy Core	LSM 510, Leica SP5, Zeiss LSM780	\$26.50	\$0.75 rate increase this year
Ohio State University Imaging Facility	Olympus FV1000	\$25	
Michigan State U Center Advanced Microscopy	Zeiss LS510 Meta	\$35	
	Olympus FV1000	\$35	
U of Washington Keck Facility	Zeiss LSM510 Meta	\$42	\$3 rate increase this year
	Leica SP1	\$42	
Oklahoma State University	Leica SP2	\$30	
U of Georgia Biomedical Microscopy	Zeiss 510 Meta	\$30	
	Zeiss 710	\$30	
UNC Medicine	Zeiss LSM510	\$30	
University of Connecticut	Leica SP2	\$10	
UVA Keck Center	Zeiss LSM510	\$35	
	Leica SP5X	\$35	
Purdue U Life Science Imaging Facility	Zeiss LSM 710	\$30	
Oregon State U	Zeiss LSM 510 Meta	\$19	Last year: \$17/hr
Yale School of Medicine	Zeiss LSM510	\$39	
	Zeiss LSM710 MP	\$39	
University of Iowa	Leica SP2	\$20	
University of Texas Austin	Leica SP2	\$45	Last year: \$40/hr
UMD School of Medicine	LSM 510 Meta	\$40	Training \$200/user
Colorado State U	Zeiss LSM510 Meta	\$40	
Boise State University	Zeiss LSM510 Meta	\$43	
Rockefeller University	Leica SP5	\$45	
Average Hourly Rate		\$32.50	

Genomics Core Facility

Genomics Core Facility Income and Expenses

1. In FY13, the Genomics Core spent \$2,244.29 more than it collected from charge-backs (Table 14).
2. At the end of FY13, the actual balance in the Genomics Core account was \$30,727.10.
3. Over the last 3 fiscal years, income from the two qPCR machines exceeded expenses by \$2,234.08. However, during FY10, the CFX96 was still under warranty, so there were no service contract expenses associated with the machine.
4. Over the last 3 fiscal years, the total amount spent on the 3730xl exceeded the amount collected from charge-backs by \$3,010.65 (Table 15).
5. Because the Core will need to purchase a new capillary array in the coming year (~\$6,000), I suggest a small rate increase of \$1 more per run on the 3730xl. I also suggest a \$1 rate increase for the qPCR machines.
6. It should be noted that, although CBMG pays for the salary of the Genomics Core Director, CBMG accounted for only 2.3% of sequencer use over the past year, and only 5.5% of sequencer use over the last 3 years.

Table 14: Genomics Core Facility Income and Expenses FY13 Only

Instrument	Income	Consumables	Service contract	Total Expenses	Balance
3730xl	\$24,224.00	\$7,639.37	\$19,882.98	\$27,522.35	\$(3,298.35)
LC480	\$8,136.31	\$1,504.75	\$5,000.00	\$7,004.75	\$1,131.56
BioRad CFX96	\$3,622.50	0	\$3,700.00	\$3,700.00	\$(77.50)
Total	\$35,982.81	\$9,144.12	\$28,582.98	\$38,227.10	\$(2,244.29)

Table 15: Genomics Core Facility Income and Expenses from FY11-13

Instrument	Income	Consumables	Service contract	Total Expenses	Balance
3730xl	\$81,868.00	\$25,229.71	\$59,648.94	\$84,878.65	\$(3,010.65)
LC480	\$17,901.60	\$5,183.15	\$16,000.00	\$21,683.15	\$(3,781.55)
BioRad CFX96	\$12,915.63	0	\$7,400.00	\$7,400.00	\$5,515.63
Total	\$112,685.23	\$30,412.86	\$83,048.94	\$113,961.80	\$(1,276.58)

Table 16: Genomics Core Instrument Usage FY11-13

Year	Roche LC480 hours	Bio-Rad CFX96 hours	3730xl # runs
FY11	409	589	871
FY12	448	506	597
FY13	736	407	604
Total	1593	1501	2072

Figure 4: DNA Sequencer Use by Department FY13

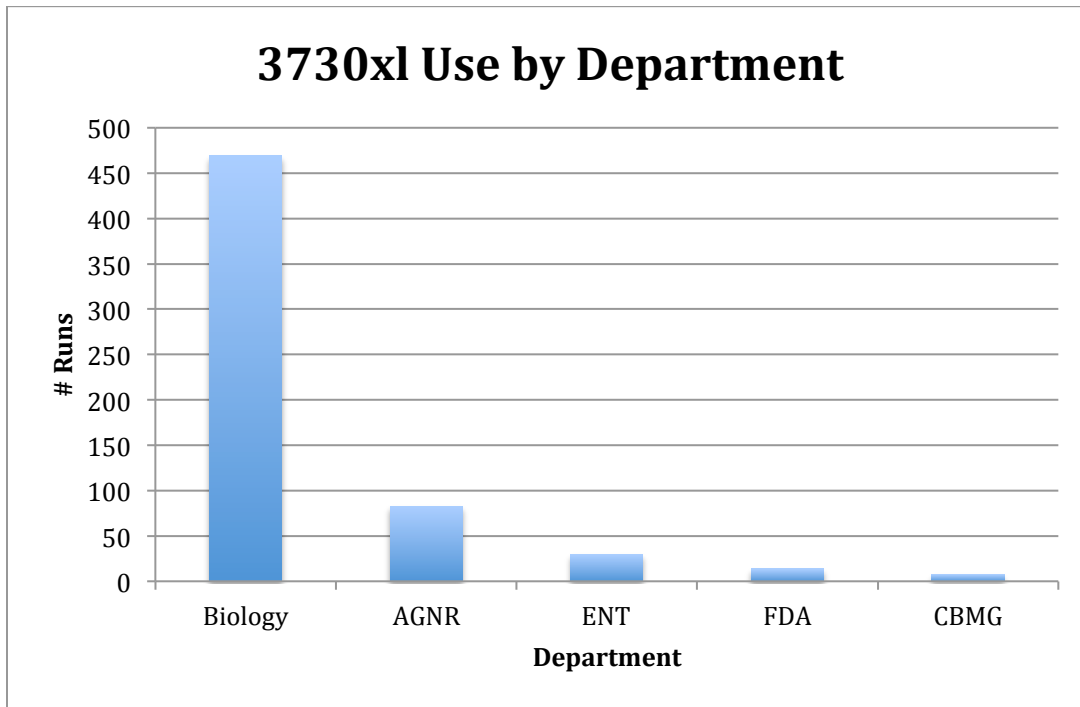
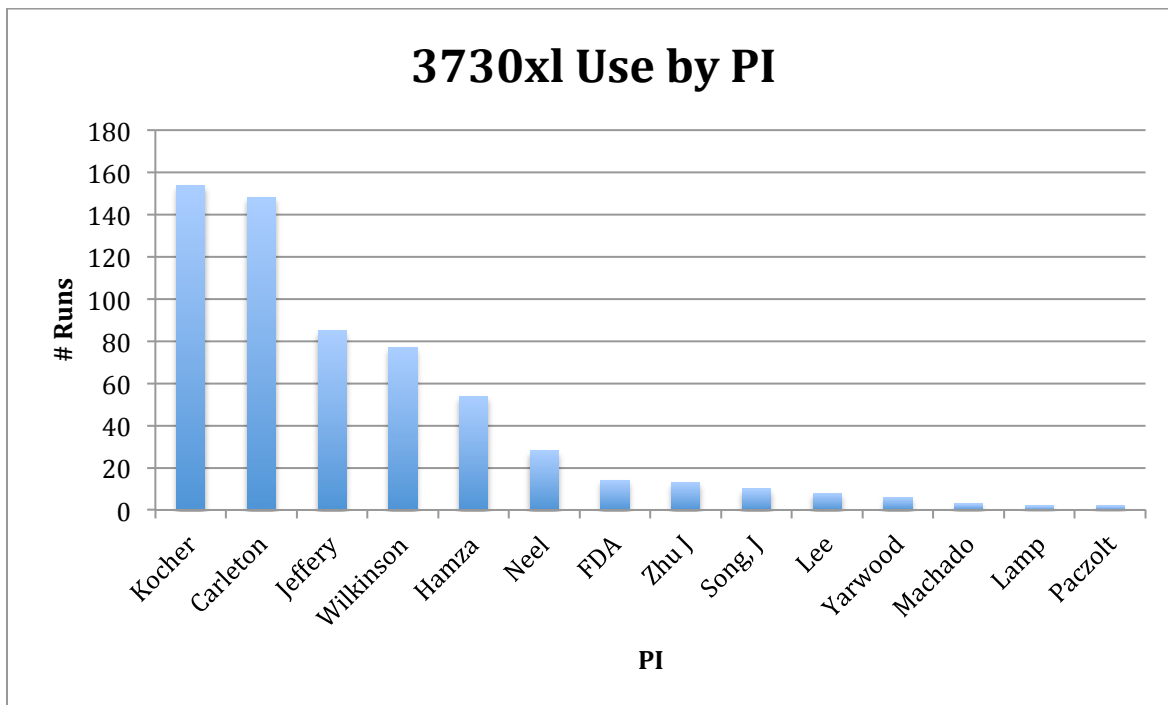


Figure 5: Top DNA Sequencer Users FY13



Current and Proposed (in parenthesis) Imaging and Genomics Core Rate Schedule

Instrument	Users within CMNS	On-campus users not affiliated with the College	Users not affiliated with the campus
Zeiss LSM710	\$26/hr- peak \$23/hr - off-peak	\$39.00	\$78.00/hr
Leica SP5 X	\$26/hr- peak \$23/hr - off-peak	\$39.00	\$78.00/hr
DeltaVision Deconvolution	\$8.00/hr (\$8.00/hr)	\$11.00/hr (\$11.00/hr)	\$20.00/hr (\$20.00/hr)
Olympus Fluorescence	\$2.00/hr (\$2.00/hr)	\$2.00/hr (\$2.00/hr)	\$2.00/hr (\$2.00/hr)
Axiophot Fluorescence	\$2.00/hr (\$2.00/hr)	\$2.00/hr (\$2.00/hr)	\$2.00/hr (\$2.00/hr)
MiniMed Film Processor	\$0.00 (\$0.00)	\$0.00 (\$0.00)	\$0.00 (\$0.00)
ABI 3730xl South DNA Analyzer	\$39.00/run (\$40.00/run)	\$39.00/run (\$40.00/run)	\$100.00/run (\$100.00/run)
Roche LightCycler 480 Real-Time PCR	\$9.00/hr (\$10.00/hr)	\$15.00/hr (\$16.00/hr)	\$22.00/hr (\$23.00/hr)
Bio-Rad CFX 96 Real-Time PCR	\$9.00/hr (\$10.00/hr)	\$15.00/hr (\$16.00/hr)	\$22.00/hr (\$23.00/hr)