

Core Facilities Annual Report FY2014

Dr. Charles Delwiche and Amy Beaven

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Executive Summary

The IC's two confocal microscopes, a Leica SP5X and a Zeiss LSM710, saw a combined average use of 39.6 hours per week in FY14, which is a 5.5% decrease from the previous year. The Zeiss was used 287.5 more hours than the Leica (1173.75 hours vs. 886.3 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 newly installed hybrid detector (HyD) and time gating technology.

From FY09 through the end of FY14, 355 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 at least 56 publications, bringing the total number of publications made possible through the use of the IC's current and previous microscopes to at least 103 (detailed below, under "Publications").

The IC implemented a new variable rate system for the confocal microscopes in FY13, where "peak" times (M-F, 8am-6pm, weekends/holidays) were charged at a rate of \$26/hr and "off-peak times" (all other times) were charged at \$23/hr. In FY14, 19% of all confocal use occurred during off-peak hours. The director of the IC recommends we continue offering the variable rate system rate system through FY15.

Two new microscopes were added to the IC in FY14: A Ziess AxioObserver widefield fluorescence microscope and a DeltaVision Deconvolution/TIRF system. The Zeiss scope was relocated to the IC from the Bioscience Research Building, and was upgraded with a new computer, software, and power supply using a combination of departmental funds (obtain via a "small grant" offering) and IC funds. This scope, which now runs the same software as the Zeiss LSM710 confocal, offers an alternative imaging resource for users who do not need confocal images. The DeltaVision deconvolution/TIRF system was purchased with departmental and CMNS funds. It was installed in March with an introductory price of \$10/hr (including training) and to date has been used for only 31.75 hours.

In FY14, consumable and service contract expenses for all facility microscopes exceeded the total income collected via charge-backs by \$3,691.00. Based on projections of confocal use, if rates and usage remain unchanged, the confocal microscopes will lose \$7,106.00 by 2020. While it is too early to predict how many hours the DeltaVision will be used in the coming months/years, if usage does not increase, total losses incurred by all instruments will be reach \$109,609 by FY20.

A thorough investigation of microscope hourly rates at other institutions (Table 13) shows the IC's confocal, DeltaVision and widefield rates are well below the average charged at similar institutions (\$35/hr, \$48/hr and \$18/hr respectively). The director of the IC recommends both the confocal and DeltaVision rates be increased in the 2014 academic/FY15 year. Please see Table 17 for a summary of recommended instruments rates.

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 Zeiss LSM710 and Leica SP5X), a DeltaVision deconvolution/TIRF microscope (installed in March FY14), a Zeiss AxioObserver fluorescence microscope (available for use in February FY14), a Zeiss AxioPhot brightfield microscope 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 355 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 FY10-14 Annual Reports). The analysis showed that a gradual increase in hourly instrument rates were necessary in order for the facility to become financially independent. As such, user fees were incrementally increased over several years in the hopes that the IC would be able to cover all maintenance and service contract costs through user fees alone. With additional rate increases, this may soon be possible.

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. Jose Feijo, Professor (CBMG), Dr. Iqbal Hamza, Professor (ANSC), Dr. Wolfgang Losert, Professor (PHYS), and Dr. Stephen Wolniak, 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 MRI grant.
- October 2009: The LSM510 confocal microscope was dismantled to make way for the new LSM710 confocal microscope. The LSM710 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).
- February 2014: a Zeiss AxioObserver widefield fluorescence microscope was relocated from room 3207 Bioscience Research Building. The microscope was installed in room 0107K and upgraded with a new computer, new software (Zen 2012) and a new power supply, using a combination of departmental and IC funds.
- March 2014: A DeltaVision Deconvolution/TIRF microscope was installed in room 0107F MICB. The microscope was acquired through departmental and college funds.
- April 2014: Financial responsibility for the DNA sequencer was transferred to the Biology Department. The director of the Imaging Core still manages the instrument.

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 2013/2014: \$26.00/hr Peak 2013/2014: \$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 2013/2014: \$26.00/hr Peak 2013/2014: \$23.00/hr Off-Peak
Deltavision Deconvolution/ TIRF Microscope	0107F MICB	Standard DAPI, FITC, TRITC, mCherry, CY5, CFP, YFP filters, automated stage	March 2014	2012/2013: \$10/hr
Zeiss AxioObserver Fluorescence	0107K	Standard DAPI, FITC, TRITC filters	February 2014	2012/2013: \$5/hr
Axiophot Fluorescence Microscope	Main lab	CoolSnap B&W camera, workstation with Nikon Elements	CoolSnap, Elements: July 2007	\$2.00/hr since installation
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 2013/2014: \$39.00/run April 2013: \$55.00/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 2013/2014: \$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 2013/2014: \$9.00/hr

Summary of Facility Usage

During FY14, use of the Zeiss LSM710 averaged 22.6 hours per week and Leica SP5X use averaged 17 hours per week. The combined average usage of 39.6 hours per week is a decrease from previous years (42 hours per week in FY13 and 43.6 hours per week in FY12), 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
2014	\$25,160.55	886.3	71.25	34
Total	\$116,708.66	5,793.40	351.21	215

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
2014	\$31,470.75	1173.75	1.5	17
Total	\$139,073.51	6231.43	1.5	140

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
2014	\$56,631.30	2060.05	72.75	51
Total	\$255,782.17	12,024.82	352.71	355

During FY14, 51 different laboratories from 11 different departments (AGNR, BioENGR, Biology, CBMG, Chem/Biochem, ENGR, ENT, Hearing/Speech, IBBR, Psychology, Physics, UMBI) and 1 off-campus laboratory (USGS) made use of the facility's confocal microscopes. CBMG accounted for 46.8% of the total microscope use (Figure 3).

Figure 1: Top Confocal Users by Department FY14

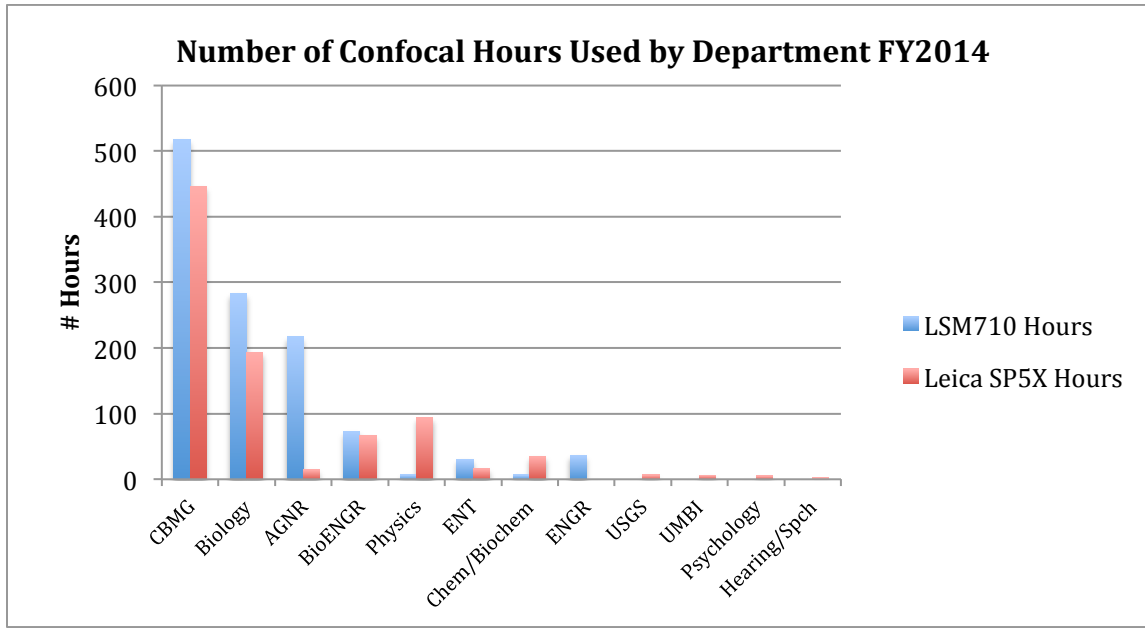


Figure 2: Top Confocal Users FY14

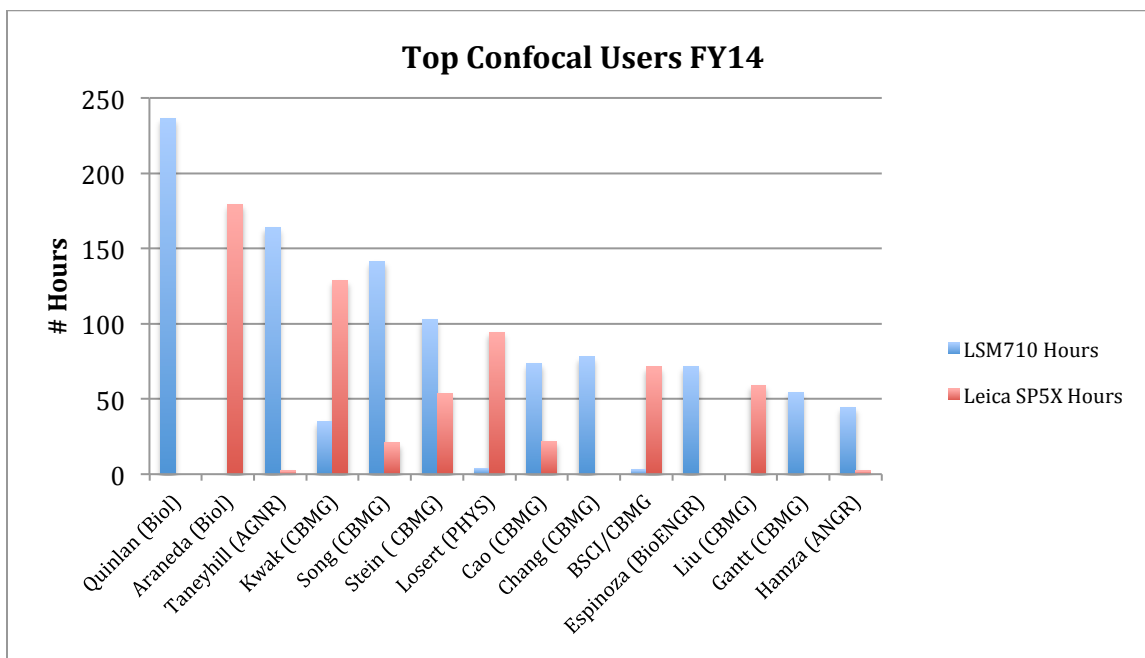
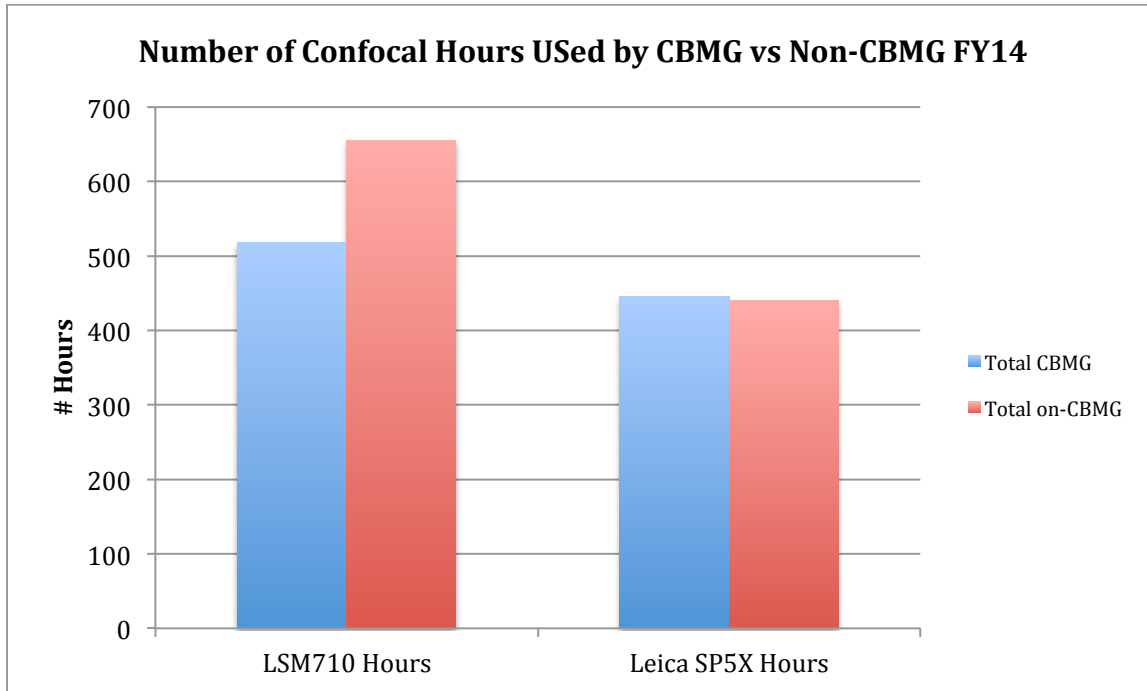


Figure 3: CBMG versus non-CBMG Use of Confocal Microscopes FY14



Publications

Publications that entailed the use of the Zeiss LSM 510:

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Publications that entailed the use of the Leica SP5 X (to date):

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Outreach Activities During FY14

1. The IC hosted two deconvolution/TIRF demonstration microscopes:
 - a. July 16-19, 2013: DeltaVision deconvolution/TIRF microscope.
 - b. August 20-13, 2013: Leica deconvolution demonstration.
2. The IC Organized a Zeiss Technology Day on December 17, 2013. Seminars included:
 - a. "Imaging life samples with LightSheet Fluorescence Microscopy"
 - b. "Advances in 3D Scanning Electron Microscopy for the Biosciences" (3View)
 - c. Laser Capture Microdissection Technology and Applications
3. The IC submitted a preproposal for a DeltaVision deconvolution/TIRF system to the on-campus NSF MRI committee. The committee selected it as one of 3 proposals to be submitted to NSF. Accordingly, the Director and Dr. Charles Delwiche prepared a full proposal grant for an Andor W1 spinning disk confocal system (because the department and CMNS already purchased a DeltaVision system). The proposal was submitted on January 23, 2013 but was not selected for funding.
4. The IC hosted three confocal spinning disk microscope demonstrations:
 - a. May 13-17, 2014: Nikon X1 system
 - b. May 27-June 3, 2014: Andor X1
 - c. June 9-18, 2014: Perkin Elmer UltraView VoX
5. 2013 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.
6. 2013 Fall Semester: Amy Beaven assisted members of BSCI415 with the acquisition of confocal images.
7. June 28-July 13, 2014: Amy Beaven attended the EMBO course on 3-D Developmental Imaging at the Instituto Gulbenkian de Ciencia, Oeiras, Portugal.

Operating Cost Analysis

At the end of FY14, the Imaging Core account held a balance of \$120,704.20. The balance will be used in the current fiscal year to pay for both confocal microscope service contracts, a total of \$93,443.00 (one year contract for Zeiss LSM710 and 2 year contract for SP5X).

Table 6: Total Imaging Core Facility Income and Expenses from FY09-FY14

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)
FY2014	\$56,351.50	\$59,365.43	\$-(3,691.40)
Total	\$264,064.00	\$286,334.52	\$80,522.60

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)
FY2014	\$37,091.50	\$359.92	\$25,160.55	0	\$(-12,290.87)
Total	\$188,554.00	\$201,834.44	\$116,708.66	\$112,500.00	\$27,374.22

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
FY2014	\$19,260.00	\$359.92	\$31,470.75	0	\$12,210.75
Total	\$75,510.00	\$7,163.39	\$139,073.13	0	\$56,659.66

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.

Projected Cost Analysis:

Assuming rates, service contract costs and instrument usage remain unchanged; the Imaging Core will lose \$18,268.21 each year (Table 9), for net loss of \$109,609.26 (Table 10). These calculations take into account all microscope expenses (including service contracts on the 2 confocals and DeltaVision), and do not take into account unexpected large expenses, such as the replacement of objective lenses. If "peak" rates are increased by \$2/hr and "off-peak" rates are increased by \$1/hr, and the DeltaVision rate is set to the confocal rates, the net loss will decrease to \$75,488.16 (Table 11). If the DeltaVision is removed from the calculation (because it is difficult to project usage with only 2.5 months of available data), and only the two confocal are taken into account, the facility will gain \$13,299.36 (Table 12).

Table 9: Yearly projected Income and Expenses: If rates remain unchanged

Microscope	Projected Expenses (consumables & service contracts)	Projected Income	Income-Expenses
SP5X	\$37,451.42	\$24,594.30	\$(12,857.12)
LSM710	\$19,619.92	\$31,292.75	\$11,672.83
DeltaVision	\$18,353.92	\$1,270.00	\$(17,083.92)
Total	\$75,425.26	\$57,157.05	\$(18,268.21)

Table 10: Projected Account Balance Through FY20: If rates remain unchanged

Microscope	Projected Expenses (consumables & service contracts)	Projected Income	Income-Expenses
SP5X	\$ 224,708.52	\$147,565.80	\$(77,142.72)
LSM710	\$ 117,719.52	\$187,756.50	\$70,036.98
DeltaVision	\$110,123.52	\$7,720.00	\$(102,503.52)
Total	\$452,551.56	\$342,942.30	\$(109,609.26)

Table 11: Projected Account Balance Through FY20: If "peak" rates are raised \$2/hr and off-peak are raised by \$1/hr

Microscope	Projected Expenses (consumables & service contracts)	Projected Income	Income-Expenses
SP5X	\$ 224,708.52	\$155,840.40	\$(68,868.12)
LSM710	\$ 117,719.52	\$199,887.00	\$82,167.48
DeltaVision	\$110,123.52	\$21,336.00	\$(88,787.52)
Total	\$ 75,425.26	\$377,063.40	\$(75,488.16)

Table 12: Projected Account Balance for ****Confocals Only**** Through FY20: If "peak" rates are raised \$2/hr and off-peak are raised by \$1/hr

Microscope	Projected Expenses (consumables & service contracts)	Projected Income	Income-Expenses
SP5X	\$37,451.42	\$155,840.40	\$(68,868.12)
LSM710	\$19,619.92	\$ 199,887.00	\$82,167.48
Total	\$342,428.04	\$355,727.40	\$13,299.36

Proposed Rate Schedule:

A thorough examination of confocal microscope rates at other institutions (Table 15) shows that the facility's microscopes are priced below average. The average rate for similar confocal microscopes at 22 institutions was \$35/hour, and the average rate for a DeltaVision system was \$48/hr. Due to the projected facility shortfall of \$109,609.26 by FY20, and taking into consideration fees at other institutions, the following rate schedule is proposed for the 2014-2015 academic year (Table 13-14).

Table 13: Proposed rate schedule for unassisted use of both confocals and DeltaVision:

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)	\$40/hr	\$80/hr
2014/2015	\$28/hr (peak) \$24/hr (off-peak)	\$40/hr	\$80/hr

Table 14: 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
2014/2015	\$50.00	\$60.00	\$180.00

Table 15: Example Microscope Rates (updated July 2014)

Facility	Instrument	Hourly Rate	Additional Information
Berkeley Biological Imaging Facility	Zeiss LSM710	\$35	Training \$147.50/user for each instrument
	Zeiss LSM510 meta	\$29	
	DeltaVision	\$40	
Cornell U Life Sciences Imaging Core	Zeiss LSM710	\$35	LSM710 Training \$85/hr; rate is \$5 increase from last year; Andor training is \$80/hr
	Leica SP2	\$20	
	Olympus fluor.	\$15	
	Andor Spinning Disk	\$30	
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 MP	\$31	Training is \$22.50/hr
Northwestern U Biological Imaging	Leica SP5	\$35	\$5 increase over last year for SP5
	Zeiss LSM510	\$35	
	Leica Spinning Disk	\$35	
	DeltaVision	\$30	
Arizona State Imaging Facility	Leica SP5	\$40	
Duke University Light Microscopy Core	SP5, LSM780	\$26.50	*website notes that the scopes are heavily subsidized
	Spinning Disk	\$18	
Ohio State U	Olympus FV1000	\$30	\$5 increase from last year
Michigan State U Center Advanced Microscopy	Zeiss LS510 Meta	\$35	
	Olympus FV1000	\$35	
U of Washington Keck Facility	Zeiss LSM510 Meta	\$42	
	Leica SP2	\$42	
	DeltaVision	\$84	
	Widefield scopes	\$26	
Oklahoma State University	Leica SP2	\$30	
UNC Chapel Hill Michael Hooker Facility	Zeiss LSM510	\$39	
	Leica SP2	\$39	
	PE Spinning Disk	\$29	
University of Connecticut	Leica SP2	\$10	
	Andor Spinning Disk	\$15	
UVA Keck Center	Zeiss LSM510	\$35	Training fee is \$200/ person for confocals and \$100/person for widefield
	Leica SP5X	\$35	
	Widefield scopes	\$15	
Purdue U Life Science Imaging Facility	Zeiss LSM 710	\$30	
Oregon State U	Zeiss LSM 510 Meta	\$21	\$2 increase from last year
Yale School of Medicine	Zeiss LSM510	\$45	\$5 increase from last year
	Zeiss LSM710 MP	\$45	
Texas A&M	Olympus FV1000	\$41	
UMD School of Medicine	LSM 710	\$40	Training \$200/user
Colorado State U	Zeiss LSM510 Meta	\$40	
Boise State University	Zeiss LSM510 Meta	\$43	
Rockefeller University	Leica SP5	\$49	\$4 increase from last year
	Spinning Disk	\$37	
	DeltaVision	\$37	
Average Hourly Rate Confocals		\$35	(\$2.50 increase)

Genomics Core Facility

Genomics Core Facility Income and Expenses

1. Over the last 4 fiscal years, income from the two qPCR machines exceeded expenses by \$1,417.08 (Table 18). The actual account balance in the Genomics Core (which no longer includes income or expenses from the DNA sequencer) is: \$9,242.09. Based on this, the facility director recommends no rate increase for the 2014/2015 academic year.
2. Over the last 4 fiscal years, the total amount spent on the 3730xl exceeded the amount collected from charge-backs by \$12,719.50 (Table 17). Financial responsibility for the DNA sequencer was transferred to the Biology department in April 2014.

Table 16: Genomics Core Facility Income and Expenses FY14

Instrument	Income	Consumables	Service contract	Total Expenses	Balance
3730xl	\$19,721.00	\$9,546.87	\$19,882.98	\$29,429.85	\$-(9,708.85)
LC480	\$4,502.25	0	\$5,500.00	\$5,500.00	\$-(997.75)
BioRad CFX96	\$4,380.75	0	\$3,700	\$3,700.00	\$68.75
Total	\$28,604	\$9,546.87	\$29,082.98	\$38,629.85	\$-(10,025.85)

Table 17: Genomics Core Facility Income and Expenses from FY11-14 (4 years)

Instrument	Income	Consumables	Service contract	Total Expenses	Balance
3730xl	\$101,589.00	\$34,776.58	\$79,531.92	\$114,308.50	\$-(12,719.50)
LC480	\$22,403.85	\$5,183.15	\$22,000.00	\$27,183.15	\$-(4,779.30)
BioRad CFX96	\$17,296.38	0	\$11,100.00	\$11,100.00	\$6,196.38
Total	\$141,289.23	\$39,959.73	\$112,631.92	\$152,591.65	\$-(11,302.43)

Table 18: qPCR Machine Income and Expenses from FY11-FY14 (4 years)

Instrument	Income	Consumables	Service contract	Total Expenses	Balance
LC480	\$22,403.85	\$5,183.15	\$22,000.00	\$27,183.15	\$-(4,779.30)
BioRad CFX96	\$17,296.38	0	\$11,100.00	\$11,100.00	\$6,196.38
Total	\$39,700.23	\$5,183.15	\$33,100.00	\$38,283.15	\$1,417.08

Figure 4: DNA sequencer use over time

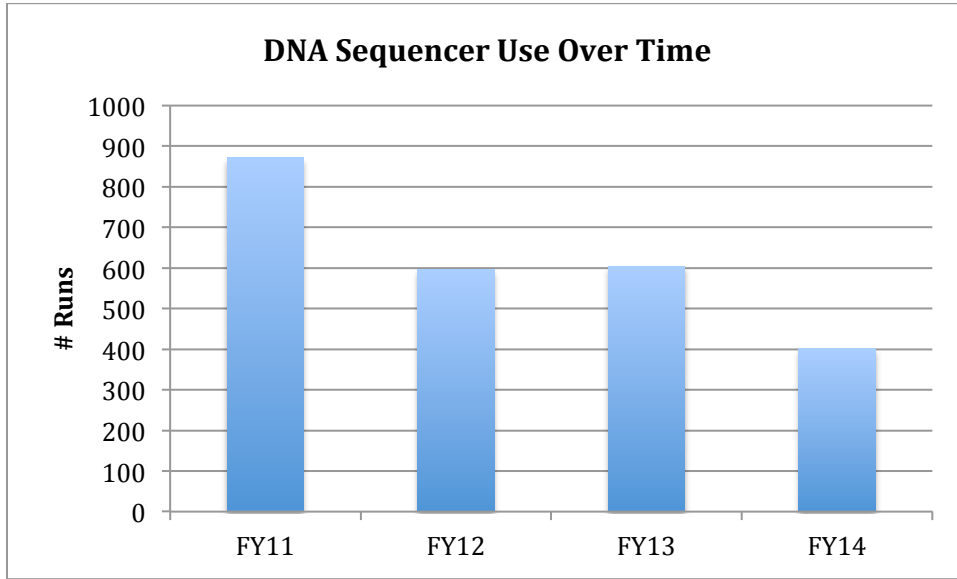


Figure 5: qPCR machine use over time

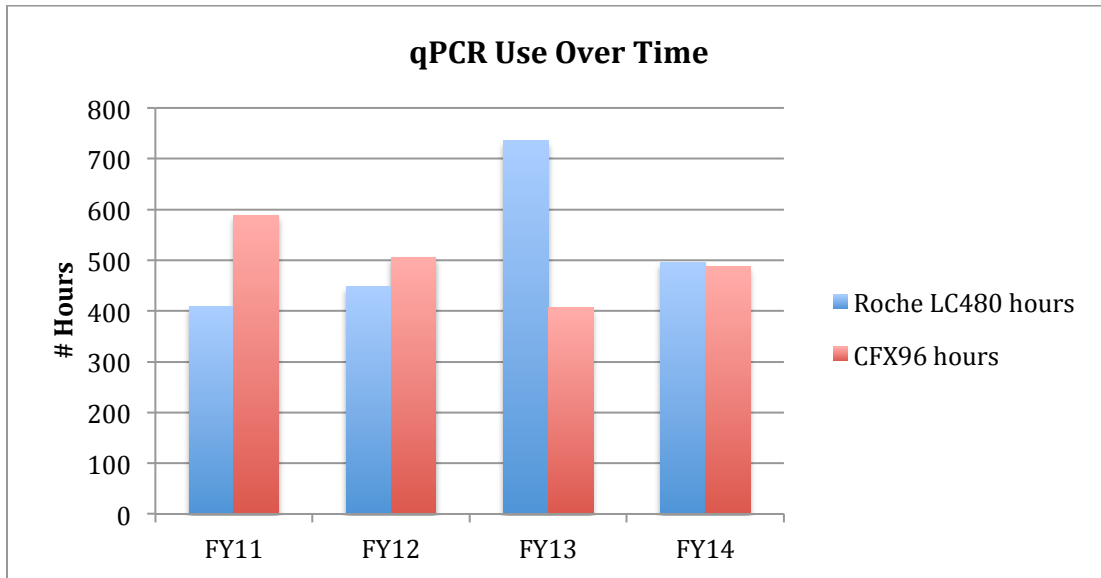


Figure 6: Sequencer use by department FY14

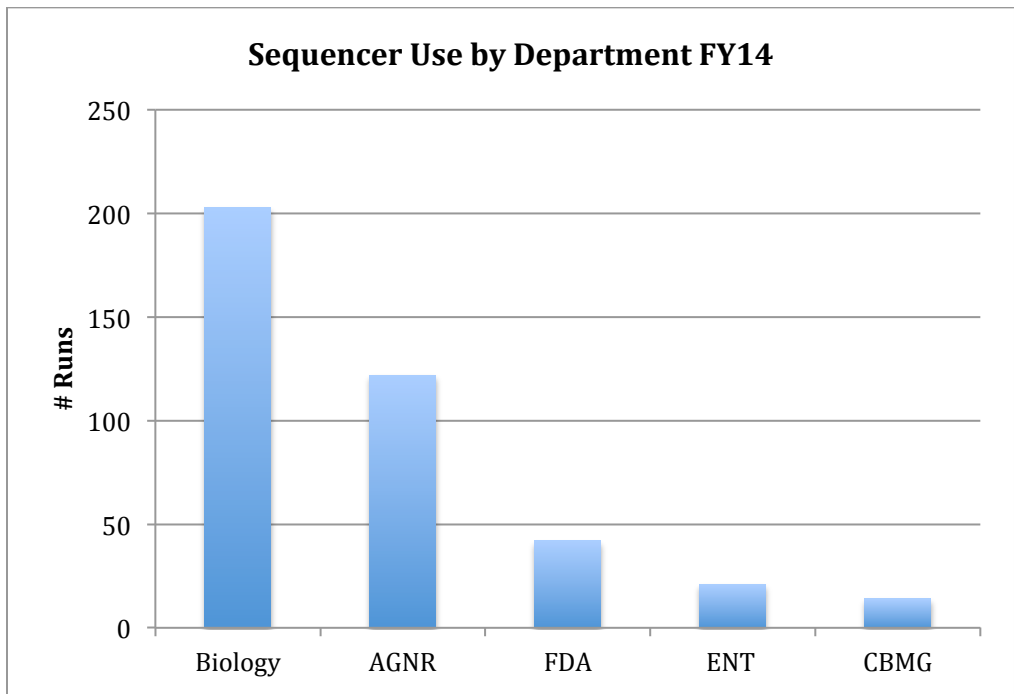


Table 17: Current and Proposed (in parenthesis) Imaging and Genomics Core Rate Schedule

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 (\$28/hr - peak) (\$24/hr - off-peak)	\$40.00 (\$40.00)	\$80.00/hr (\$80.00/hr)
Leica SP5 X	\$26/hr- peak \$23/hr - off-peak (\$28/hr - peak) (\$24/hr - off-peak)	\$40.00 (\$40.00)	\$80.00/hr (\$80.00/hr)
DeltaVision Deconvolution	\$10.00/hr (\$28/hr - peak) (\$24/hr - off-peak)	\$40.00 (\$40.00)	\$80.00/hr (\$80.00/hr)
Axiophot Fluorescence	\$2.00/hr (\$2.00/hr)	\$2.00/hr (\$2.00/hr)	\$2.00/hr (\$2.00/hr)
Zeiss AxioObserver	\$5.00/hr (\$5.00/hr)	\$5.00/hr (\$5.00/hr)	\$5.00/hr (\$5.00/hr)
MiniMed Film Processor	\$0.00 (\$0.00)	\$0.00 (\$0.00)	\$0.00 (\$0.00)
ABI 3730xl South DNA Analyzer	\$55.00/run (\$55.00/run)	\$55.00/run (\$55.00/run)	\$100.00/run (\$100.00/run)
Roche LightCycler 480 Real-Time PCR	\$9.00/hr (\$9.00/hr)	\$15.00/hr (\$15.00/hr)	\$22.00/hr (\$22.00/hr)
Bio-Rad CFX 96 Real-Time PCR	\$9.00/hr (\$9.00/hr)	\$15.00/hr (\$15.00/hr)	\$22.00/hr (\$22.00/hr)