

# Micro/Nano Technology Service Center Financial Report for FY2011

Dr. Kevin Walsh, Director  
Dr. Rob Keynton, Associate Director  
Dr. Shamus McNamara, Assisting Director  
Mark Crain, Cleanroom Manager  
Wendy S. Metcalf, Administrative Associate  
Don Yeager, Technical Staff and Facilities Coordinator  
Joseph Lake, Technical Staff and Outreach Coordinator  
Curtis McKenna, Technical Staff  
Caitlin Grothaus, Student Assistant

## **SUMMARY**

The University of Louisville Micro/Nano Technology Service Center (MNTC) is a university-recognized recharge service center established in 2004. It is utilized for both research and teaching. This document serves as its official financial report for the fiscal year ending June 30, 2011. The MNTC ended FY11 with a deficit of \$49,803 compared to a surplus of \$30,159 in FY10. Details of our financial year follow.

Table 1 presents the overall financial status of the MNTC for FYE 6/30/11. Expenditures for 2011 were \$205,971 and revenues were \$156,167, resulting in a \$49,803 deficit for the fiscal year. Unsubsidized salaries for 2011 were \$21,630 and Fringe Benefits were \$204 for a total of \$21,834 (Table 2), a significant increase from FY10 (\$10,682). Our largest expenditures were liquid nitrogen (\$48K), laboratory supplies (\$42K), and chemicals (\$31K). The university increased the administrative fee on expenses to 7% (\$13K).

Revenue for the MNTC by quarter is shown in Figure 1 and a summary is displayed in Figure 2. Of our total revenue of \$156K, 87% or \$135K came from internal users. A list of internal faculty users appears in Table 3 and Figure 3. Figure 4 breaks down our internal revenue by department, showing that 43% was generated by ECE faculty. A list of external users appears in Table 4 and external revenue (\$20K) is displayed in Figure 5. Table 5 presents a comprehensive list of all MNTC internal clients in FY11.

Comparisons of FY04 through FY11 are presented next. As shown in Figure 6, total income decreased in FY11 by \$15K from the previous year, and external income increased \$15K from the previous year. Figure 7 shows that expenses in FY11 increased by \$64K from the previous year partially due to the increase in the cost of precious metals and the purchase of a new platinum sputtering target (\$21,675) in FY11.

Figure 8 presents Total Income from Internal Users (\$1.01M) since FY04. The top 5 faculty users of the MNTC are Dr. Walsh of ECE (\$256K), Dr. Cohn of ECE (\$94K), Dr. Alphenaar of ECE (\$85), Dr. Keynton of BE (\$81K), and Dr. McNamara of ECE (\$72K).

Figure 9 presents Total Internal Income (\$1.01M) by Department since FY04. The dominant department continues to be ECE at \$598K or 59%, followed by BE at 13%, Physics at 10%, ME at 8%, and Chemistry at 2%.

Figure 10 shows the number of departments, faculty, students, post docs and researchers who have annually used the cleanroom since FY06. The number of students/researchers/post docs who utilize the facility decreased from 70 to 51 in FY11. The number of faculty users dropped slightly from 14 to 12 but the number of departments increased from 6 to 7.

Figure 11 shows the total Grant Revenue that has come into the University of Louisville as a result of grants which have used the cleanroom since 2001. This amount is a staggering \$46M with 42% coming from DOD and 16% from NSF. A significant portion of this funding would not have been possible without the unique resources of our micro/nano cleanroom facility.

Finally, Table 6 and Figure 12 shows the leveraging ability of the MNTC. Sponsored research into the University which utilized the MNTC in FY11 was an amazing \$6,911,059. Of that staggering amount, \$82,255 (1.2%) was used for cleanroom user fees.

Not captured in the MNTC Balance Sheet shown in Table 1 is the "staff subsidy" which the cleanroom receives through the University and external grant funding. The University provides CAR funding (continuing annual resources or hard money) for an

administrative position (Wendy Metcalf), a technical support position (Don Yeager), and 78% of a managerial position (Mark Crain). A Navy grant (Dr. Walsh PI) supports another two technical positions on soft funds (Joseph Lake and Curt McKenna). In total, our staff of 4.75 positions comes to approximately \$236K of support (including fringe benefits). Such human resource support is vital for the continued success of the MNTC. The MNTC operates all of its ~\$20M of capital equipment without any annual maintenance contracts. We therefore rely on our experienced technical staff to keep our sophisticated equipment operational, ensure personnel safety, and provide ongoing training to our nearly 100 cleanroom users. The afore-mentioned Navy grant ended in December of 2010 and the University (Speed Dean's Office and EVPR Office) generously agreed to pick up the 2 soft money technical positions and increase the managerial position to 100%. Therefore, beginning in January of 2011, the MNTC had 5.0 fulltime support positions (1 UBM, 1 manager, and 3 technical support engineers). Although these staff numbers are a bit on the low side when compared to other university cleanrooms of our size (10,000 sq. ft.), we are confident in our ability to deliver a safe and quality product to our client user base with a staff of this size (5).

FY11 was yet another banner year for MNTC equipment acquisitions. Through an NSF EPSCoR grant (Dr. Walsh, PI) and a DOD Navy Grant (Dr. Walsh, PI), the following items were purchased: a reconditioned Raith e-beam writer (\$143K), a Kurt Lesker PVD Magnetron Sputtering System (\$255K), and a Tektronics 370A Curve Tracer (\$17K). These acquisitions bring our total cleanroom asset value to approximately \$21M.

In conclusion, on behalf of the entire MNTC personnel, we wish to thank all the individuals who have supported and continue to support our micro/nano initiative at the University of Louisville.

\*Definitions:

**Light User @ \$550/month:** A light user doesn't use the DRIE and has less than 4hrs of mask writing time in the month.

**Heavy User @ \$800/month:** A heavy user uses the DRIE, or print over 15 hrs of LPG time, or uses large amounts of precious metal, or over 4 hrs of training.

**Power User Fee @ \$1,050/month:** This is applicable to exceptional situations when the user's research needs and expenses are not adequately covered by the Heavy User rate.

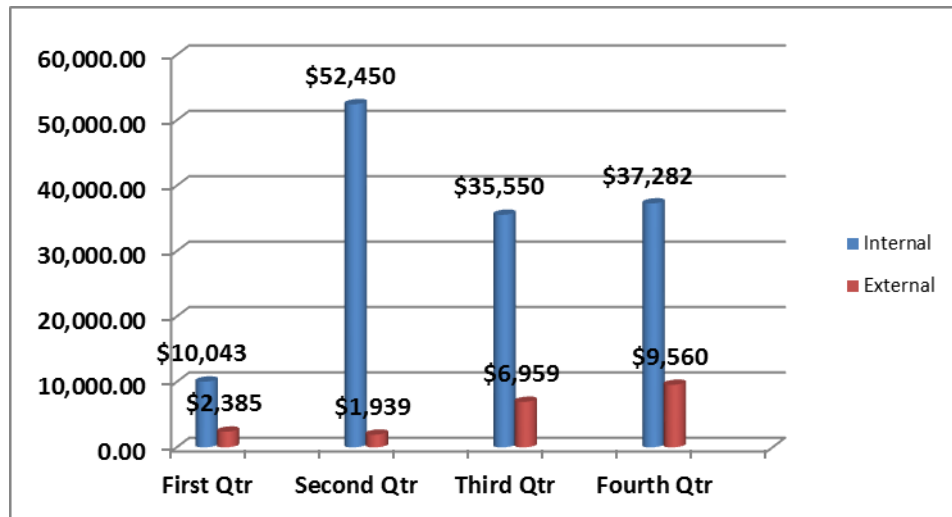
**Table 1. Financial Status of the MNTC Service Center FYE 6/30/11**

BRB Micro/NanoTechnology Cleanroom Balance Sheet		
EXPENDITURES		FY 11
SALARIES AND BENEFITS (S&B)		
Professional & Administrative		0.00
Student		19,920.29
Temp		1,710.00
Health		72.91
FICA		130.82
TOTAL		<u>21,834.02</u>
SUPPLIES AND EXPENSES (S&E)		
Offset for Purchasing		5,325.76
In-State Travel-Misc Exp.		59.63
Out -Of-State_Air		517.50
Laboratory		42,341.61
Chemicals		31,980.91
Liq. Nitrogen		48,505.18
Demurrage/Compressed Gas (cylinders)		8,162.60
Office Supplies		1,458.57
Software		487.82
Stockroom		113.31
Meeting		101.42
Maintenance Supplies		5,244.04
Construction & Renovation		3,404.26
Computer		2,492.98
Equipment		8,042.84
Security		20.00
Criminal Background Checks		51.00
Overnight and Grant Mailings		674.85
Postal Service		71.48
Printing Services		634.79
Laundry		58.50
IT-iTech Xpress		156.50
IT-Printing Svcs		40.00
IT-Copy Finishing Svcs		30.00
IT-Voice Network Monthly		282.00
IT-Cellphone Charges		1,633.67
IT-Data Network Monthly		720.00
IT-Pre Print Design		450.00
Physical Plant Services		357.61
IT-Voice Mail Svcs.		36.00
IT-uConnect Data Monthly		288.00
IT-uConnect Voice Monthly		564.00
Equipment Maint		5,139.49
IT-Internal Print/Copu Usage		79.92
Dues & Membership		19.00
Parking		20.00
Business Meals		346.62
Donations		750.00
UL Administrative Fee		13,474.70
TOTAL EXPENDITURES		<u>205,970.58</u>
INCOME		
USER FEE		
Internal Users		135,325
External Users		20,843
		<u>156,167</u>
		 \$ (49,803.18)

**Table 2 . Salaries for FY11**

Payroll Detail For:	S0083 FY 10		
	Salary	Fringe	Total
Grothaus, Caitlin (Part-time)	13,554.00	41.71	13,595.71
Parthasarathi, Kruthi (Part-time)	6,354.86	25.69	6,380.55
Russell, Zachary (Co-Op)	1,710.00	136.22	1,846.22
Velasco, Vanessa (Part-time)	11.43	.11	11.54
Worker's Comp. Ins.		101.42	101.42
<b>TOTAL</b>	<b>21,630.29</b>	<b>203.73</b>	<b>21,834.02</b>

**Figure 1. Internal and External Revenue Generated by Quarter for FY11**



**Total Amount of Internal Revenue = \$135,324.50**  
**Total Amount of External Revenue = \$20,842.90**  
**Total Amount of Revenue = \$156,167.40**

Figure 2. Total Internal and External Revenue Generated in FY11

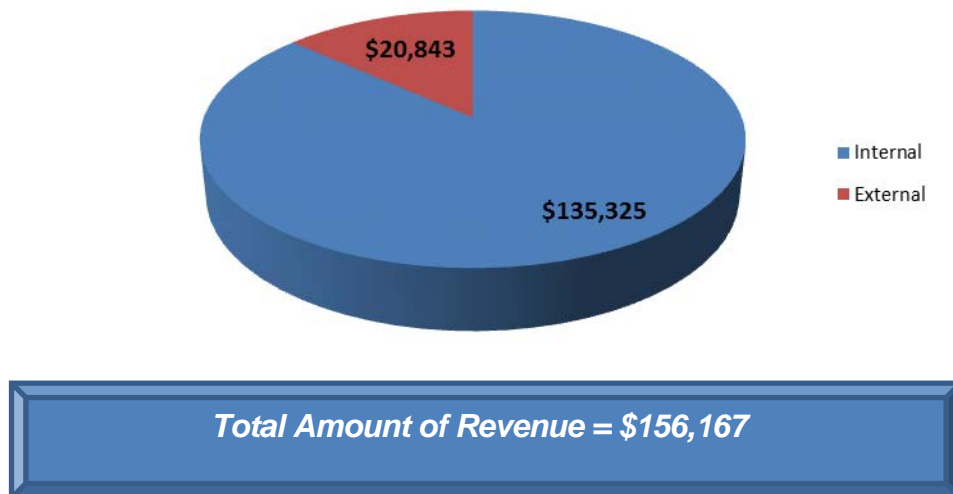


Table 3. Internal Faculty Users in FY11

Alphenaar	ECE	\$1,100
Baldwin	CHEMISTRY	\$860
Berfield	ME	\$2,750
Bradshaw	ME	\$550
Cohn	ECE	\$5,500
Fu	CHEM ENG	\$16,000
Hadizadeh	GEOGRAPHY	\$600
Harnett	ECE	\$11,000
Hnat	ME	\$6,022
Keynton	BE	\$9,350
McNamara	ECE	\$4,600
Mendes	PHYSICS	\$11,000
Panchapakesan	ME	\$10,450
Sethu	BE	\$11,550
Stolowich	CHEMISTRY	\$143
Walsh	ECE	\$35,600
Williams	ME	\$8,250
<b>TOTAL</b>		<b>\$135,325</b>

Figure 3. Internal Users in FY11

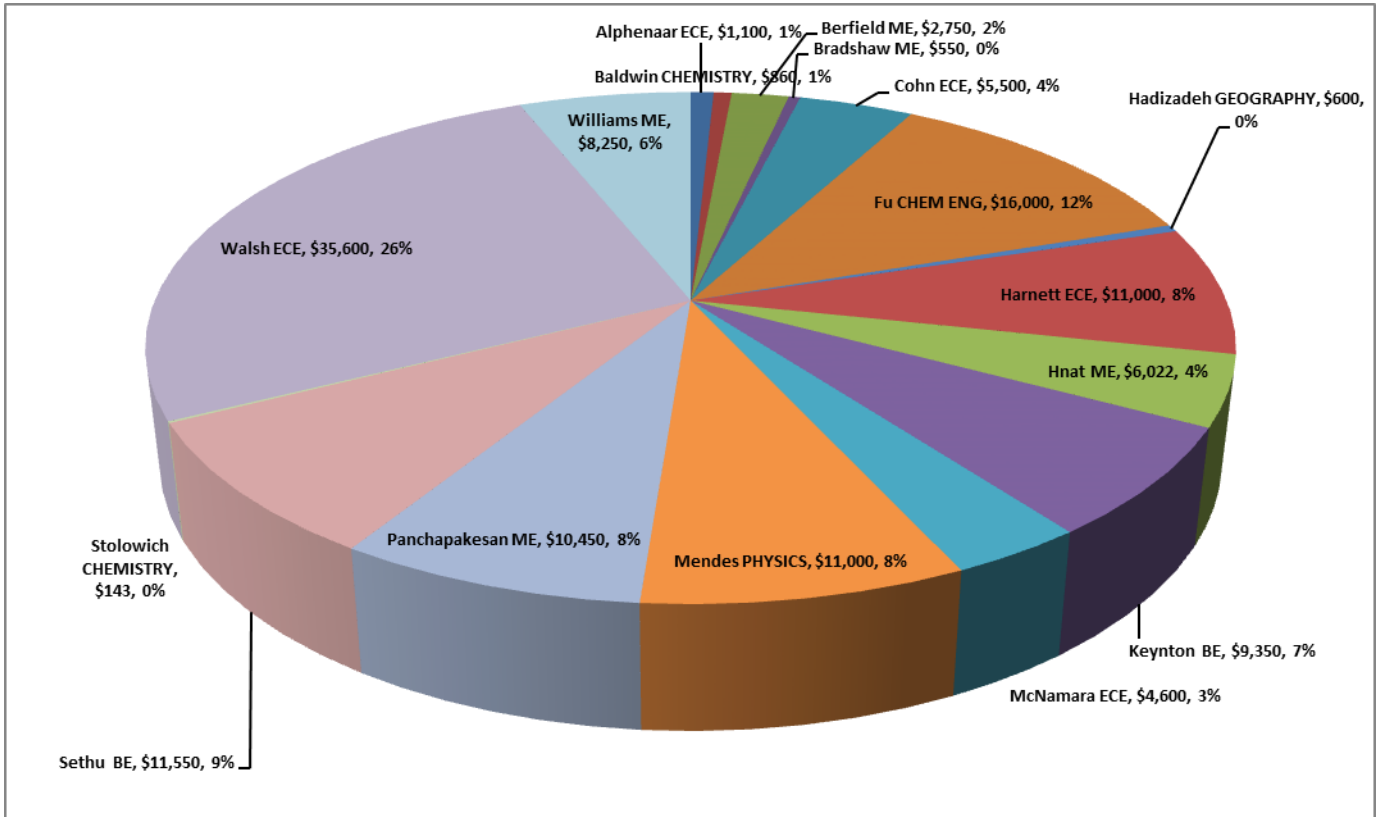
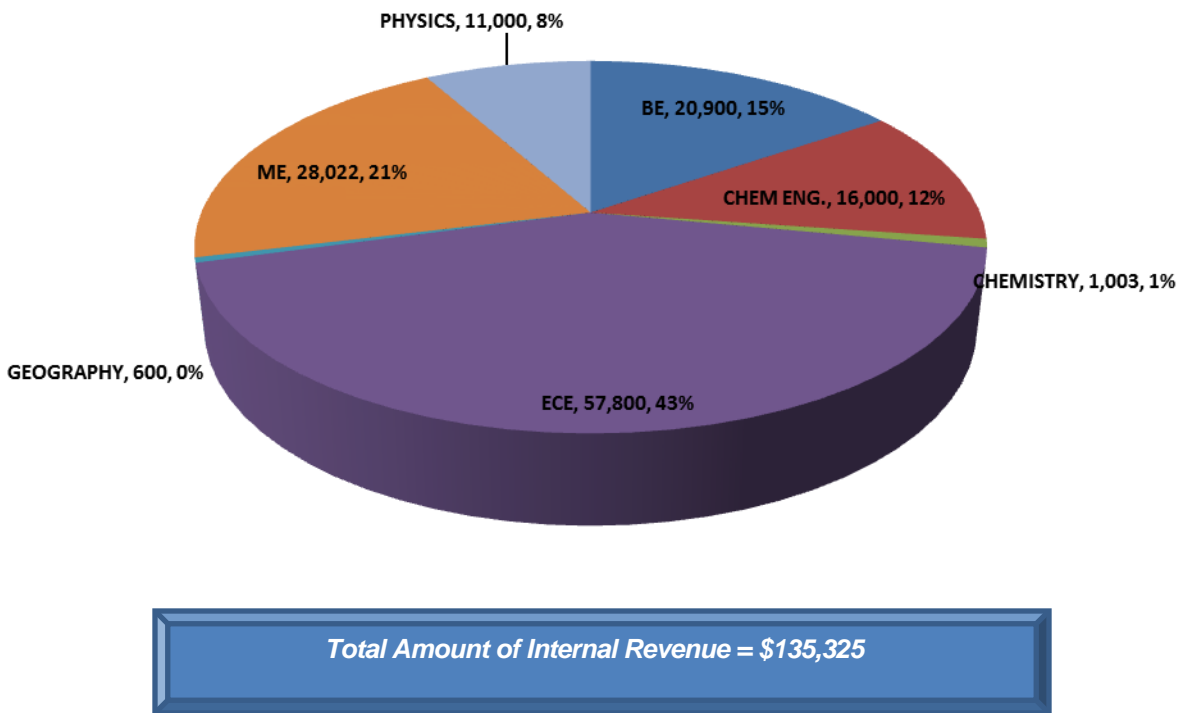


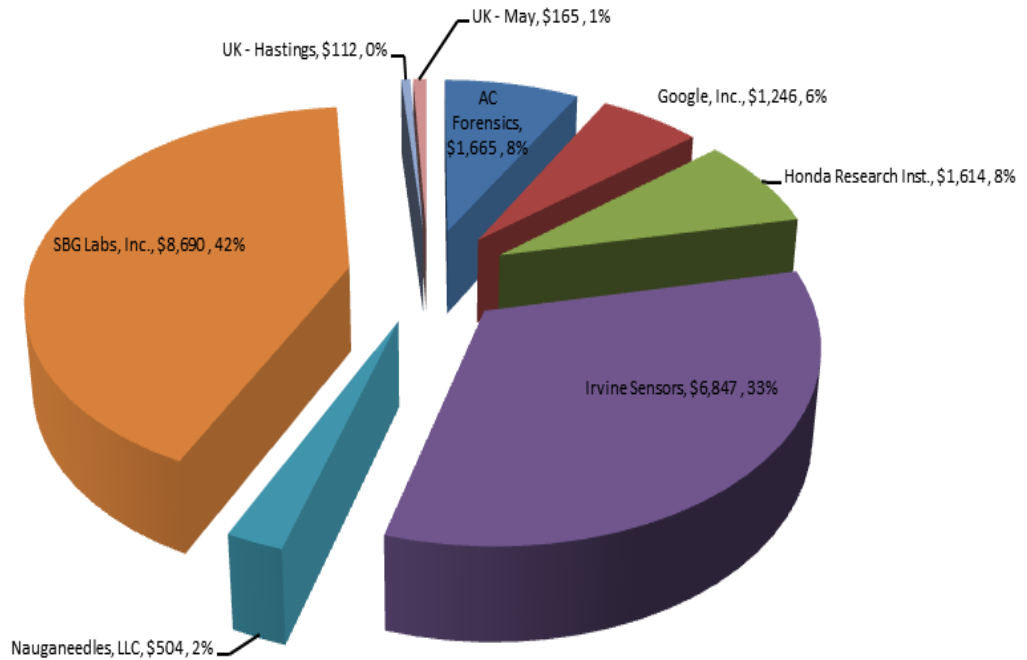
Figure 4. Internal Revenue by Departments in FY11



**Table 4. External Users in FY11**

AC Forensics	\$1,665
Google, Inc.	\$1,246
Honda Research Inst.	\$1,614
Irvine Sensors	\$6,847
Nauganeedles, LLC	\$504
SBG Labs, Inc.	\$8,690
UK - Hastings	\$112
UK - May	\$165
<b>TOTAL</b>	<b>\$20,843</b>

**Figure 5. External Users in FY11**



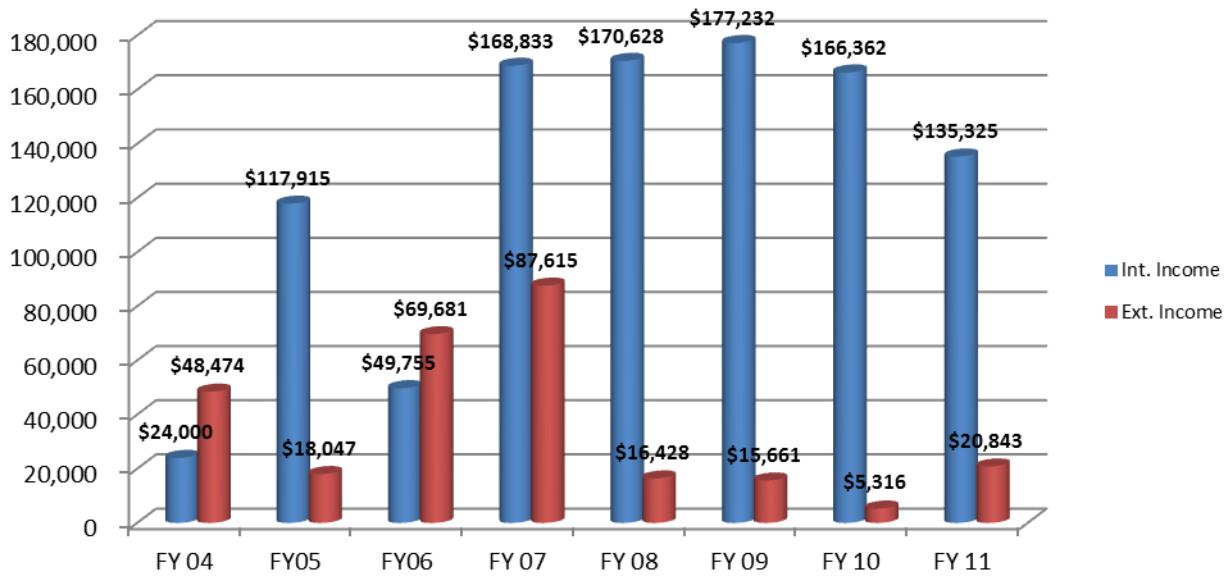
**Total Amount of External Revenue = \$20,843**

**Table 5. FY 11 Internal Cleanroom Clients**

<b>Faculty Advisors</b>	<b>Students/Post Docs/Researchers</b>	
Dr. Bruce Alphennar	Aebersold	Julia
Dr. Thomas Berfield	Arva	Sreenath
Dr. Roger Bradshaw	Bansal	Tanesh
Dr. Robert Cohn	Berger	Caleb
Dr. Xiaolan Fu	Burkhead	Thomas
Dr. Cindy Harnett	Byard	Courtney
Dr. William Hnat	Caprara	Robert
Dr. Robert Keynton	Carroll	Susan
Dr. Shamus McNamara	Chamberlin	Elizabeth
Dr. Sergio Mendes	Chapparala	Yugandhar
Dr. Balaji Panchapakesan	Chen	Jubin
Dr. Palaniappan Sethu	Crain	Mark
Dr. Kevin M. Walsh	Day	Shawn
Dr. Stuart Williams	Dong	Huihang
	Dsoouza	Raymond
	Duff	J. Dominick
	Estrada	Rosendo
	Faiz	Abderrazzak
	Goderwis	Nathan
	Gowrishetty	Usha
	Han	Xue
	King	Benjamin
	King	Kenny
	Leonard	Ryan
	Li	Mingxiao
	Lin	Ji-Tzuih
	Loomis	Robert
	Lynch	Joseph
	Marei	Mohammed
	Martin	Michael
	Miller	Kane
	Moiseeva	Evgenia
	Nguyen	Dung
	Onkst	Tyler
	Parichehreh	Vahidreza
	Pharas	Kunal
	Porter	Daniel
	Rathfon	Jeremy
	Schnitzer	Matthew
	Senousy	Yehya
	Shah	Hemant
	Smith	Scott
	Sunding	Jac
	Trada	Hiren
	Velasco	Vanessa
	Wang	Ni
	Webster	Nathan
	Wiederkehr	Rodrigo
	Wood	Nicholas
	Work	Andres
	Xu	Peng

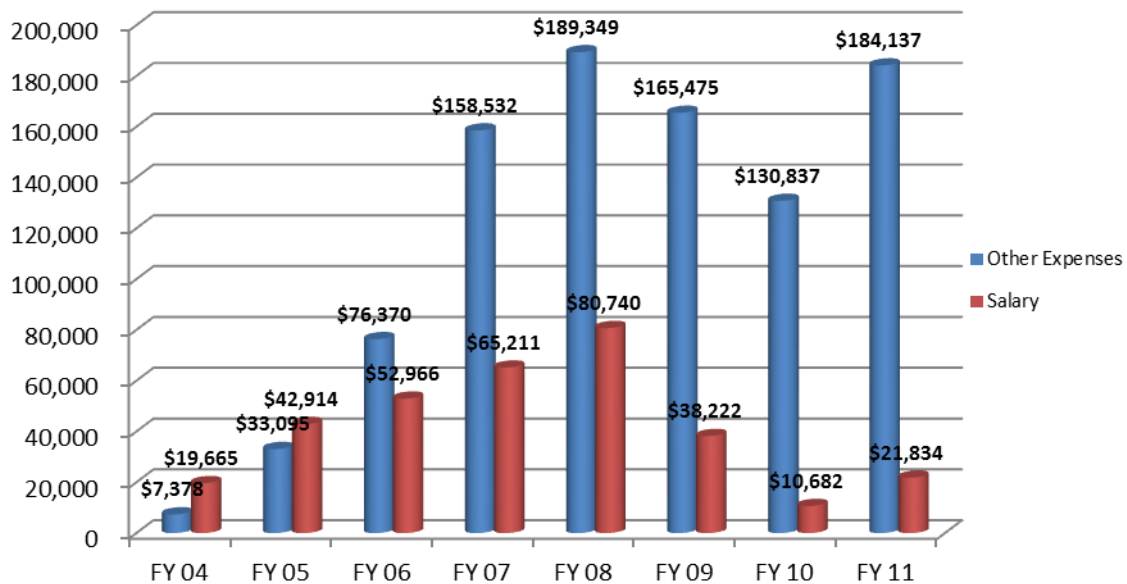


Figure 6. Comparison of Income for FY04 Through FY11



**Total Internal Income = \$1,010,050**  
**Total External Income = \$282,064**  
**Total Income = \$1,292,113**

Figure 7. Comparison of Expenses for FY04 Through FY11



**Total Other Expenses = \$945,174**  
**Total Salary = \$332,233**  
**Total Expenses = \$1,277,407**

Figure 8. Cumulative Income for Internal Users since FY 2004

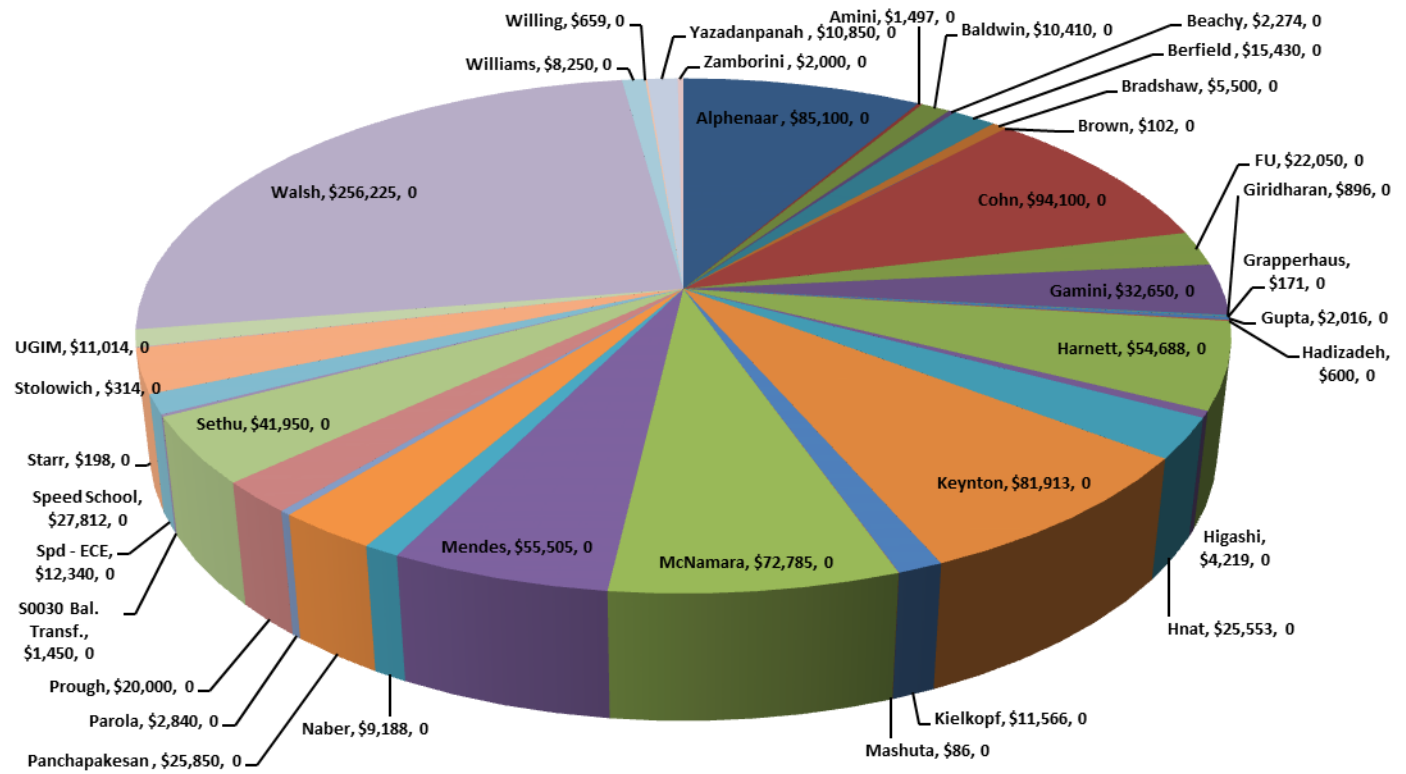
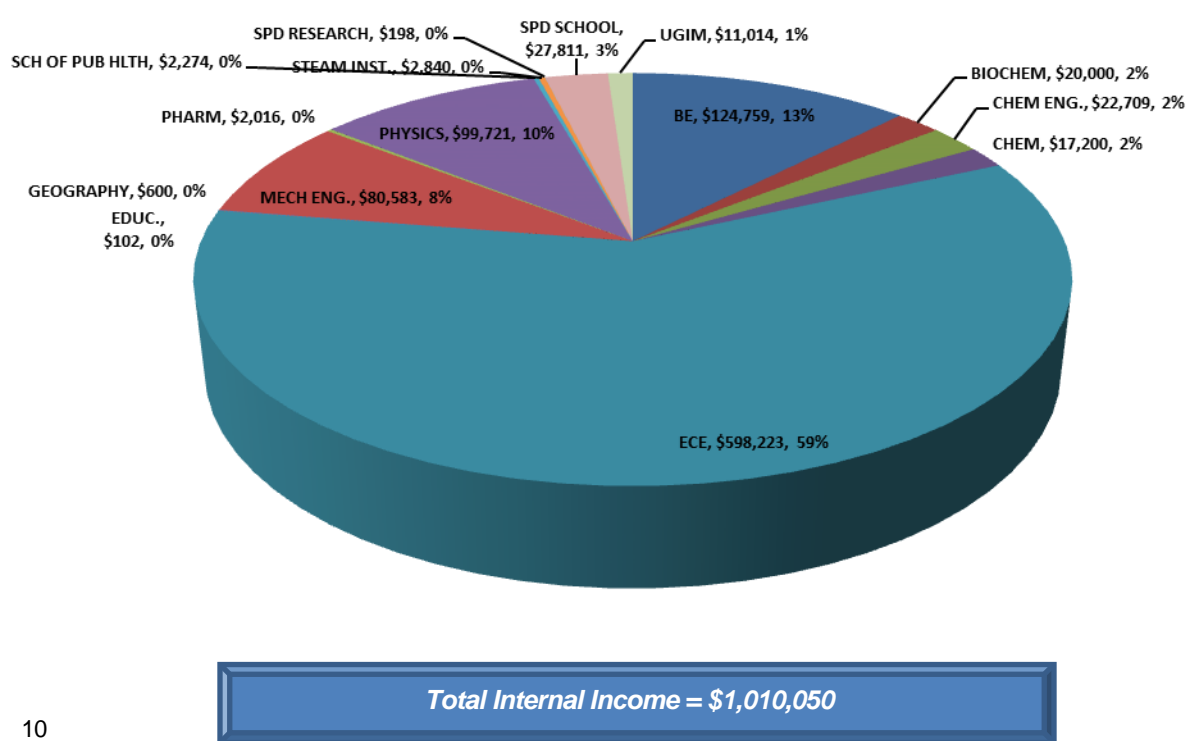
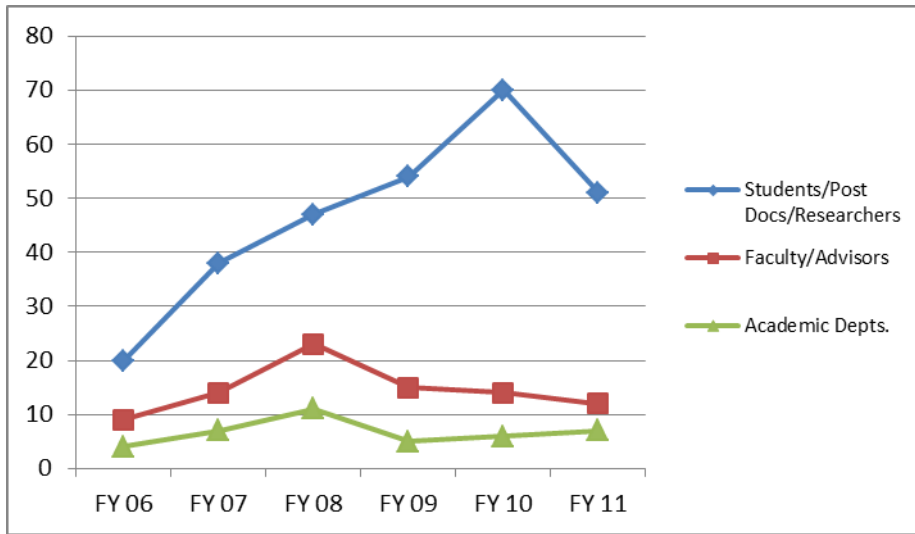


Figure 9. Cumulative Internal Income by Department since FY2004



**Figure 10. Cleanroom Access since FY06**



	Students/Post Docs/Researchers	Faculty/Advisors	Academic Depts.
FY 06	20	9	4
FY 07	38	14	7
FY 08	47	23	11
FY 09	54	15	5
FY 10	70	14	6
FY 11	51	12	7

**Students/Post Docs/Researchers**

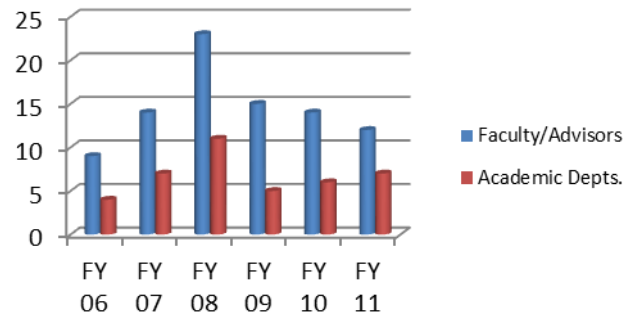
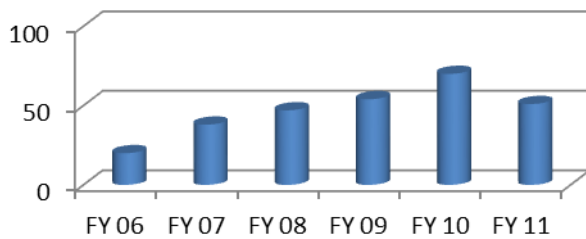
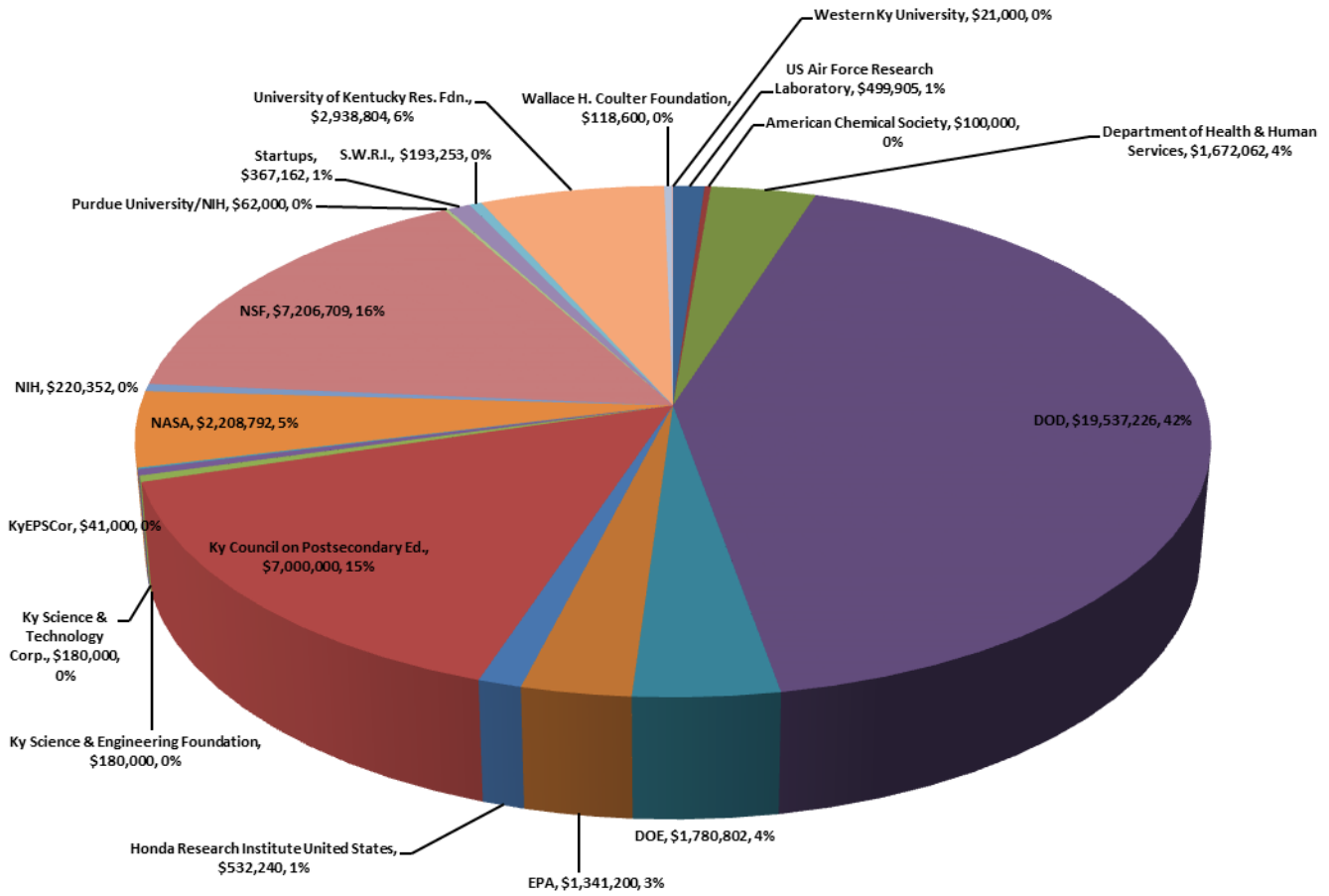


Figure 11. Total Grant Dollars that have used the Cleanroom since October 2001



**Total Grant Dollars - \$46,201,108**

**Table 6. UofL Sponsored Research Which Used the MNTC in FY11**

Indirect	Speedtype	Funding Source	Grant Agency	Fac.	PI	Dept	Title	Start Date	End Date	Total Grant Dollar Amount	Total Amt. to Service Center
Air Force - Walsh	GB100477	Grant	Air Force Rsch Lab	Walsh	Walsh	ECE	MEMS TPSS Project	9/1/2010	9/1/2011	499,905.00	6,050.00
Alphenaar	GB090532	Grant	NSF	Alphenaar	Alphenaar	ECE	Enhancement of Exciton Dissociation in Organic Solar Cell	9/1/2009	8/31/2010	339,048.00	1,100.00
Cohn	IB091502	Contract	Nauganeedles, LLC	Cohn	Cohn	ECE	Batch Fabrication of High Aspect ration Metallic AFM Prob	1/1/2010	12/31/2010	59,794.00	2,750.00
Cohn	GB090818	Grant	Ky Science & Eng. Fndn.	Cohn	Cohn	ECE	Selectively-Stimulated Self-Assembly of Polymer Thin Film	7/1/2009	12/31/2011	80,000.00	550.00
Cohn	IB101289	Sub-Contract	Nauganeedles, LLC	Cohn	Cohn	ECE	Batch Fabrication of High Aspect ration Metallic AFM Prob	4/1/2010	3/31/2011	22,763.00	1,650.00
Cohn	IB110127	Contract	Nauganeedles, LLC	Cohn	Cohn	ECE	Batch Fabrication of High Aspect ration Metallic AFM Prob	2/1/2011	1/31/2013	150,000.00	550.00
Cohn	GB101259	Grant	NASA	Cohn	Keynton	BE	Diagnosing & Mitigating Human Exposure to Radiation	9/1/2010	8/31/2012	2,000,000.00	550.00
Crane-Walsh	IB080360C	Contract	URS Corp/Formely EG&G	Walsh	Walsh	ECE	MEMS Strategies for Critical Technology Protection	9/1/2010	12/31/2010	128,357.46	30,030.00
Dr. Hadizadeh	GB060110	Grant	NSF	Hadizadeh	Hadizadeh	A&S Geog.	Microstructural Analysis of Gouge From the San Andreas	5/1/2006	4/30/2012	489,423.00	600.00
Harnett	GB070678A	Contract	KY EPSCoR	Harnett	Gobin	BE	State EPSCoR Transforming Ky's Ne Economy	6/1/2008	8/31/2013	602,180.00	12,650.00
Keynton	GB101259	Grant	NASA	Keynton	Keynton	BE	Diagnosing & Mitigating Human Exposure to Radiation	9/1/2010	8/31/2012	2,000,000.00	2,750.00
McNamara	GB070678A	Contract	KY EPSCoR	McNamara	Gobin	BE	State EPSCoR Transforming Ky's Ne Economy	6/1/2008	8/31/2013	602,180.00	2,400.00
Mendes	GB070678A	Contract	KY EPSCoR	Mendes	Gobin	BE	State EPSCoR Transforming Ky's Ne Economy	6/1/2008	8/31/2013	602,180.00	9,900.00
Panchapakesan	GB090227	Grant	NSF	Panchapakesan	Panchapakesan	ME	Carbon Nanotube Based Photomechanical Actuators	6/1/2008	5/31/2012	302,172.00	1,375.00
Sethu	GB101259	Grant	NASA	Sethu	Keynton	BE	Diagnosing & Mitigating Human Exposure to Radiation	9/1/2010	8/31/2012	2,000,000.00	2,750.00
Sethu	GB070678	Grant	University of KY Res Fnd	Sethu	Gobin	BE	Building Ky's New Economy with EPSCoR Engineering	9/1/2008	8/31/2013	2,137,417.00	3,300.00
Sethu	GB090834	Grant	Ky Science & Eng. Fndn.	Sethu	Sethu	BE	Microfluidic Cell Arrays for High-Throughput Cell Culture	7/1/2009	6/30/2011	100,000.00	2,750.00
Sethu	GB070678A	Contract	KY EPSCoR	Sethu	Gobin	BE	State EPSCoR Transforming Ky's Ne Economy	6/1/2008	8/31/2013	602,180.00	550.00
										6,911,059.46	82,255.00

**Figure 12. UofL Sponsored Research Which Used the MNTC in FY11**

