

CCMR Shared Facilities Facility Rates

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Cornell Center for Materials Research

Cornell University, Ithaca, NY

<http://www.ccmr.cornell.edu>



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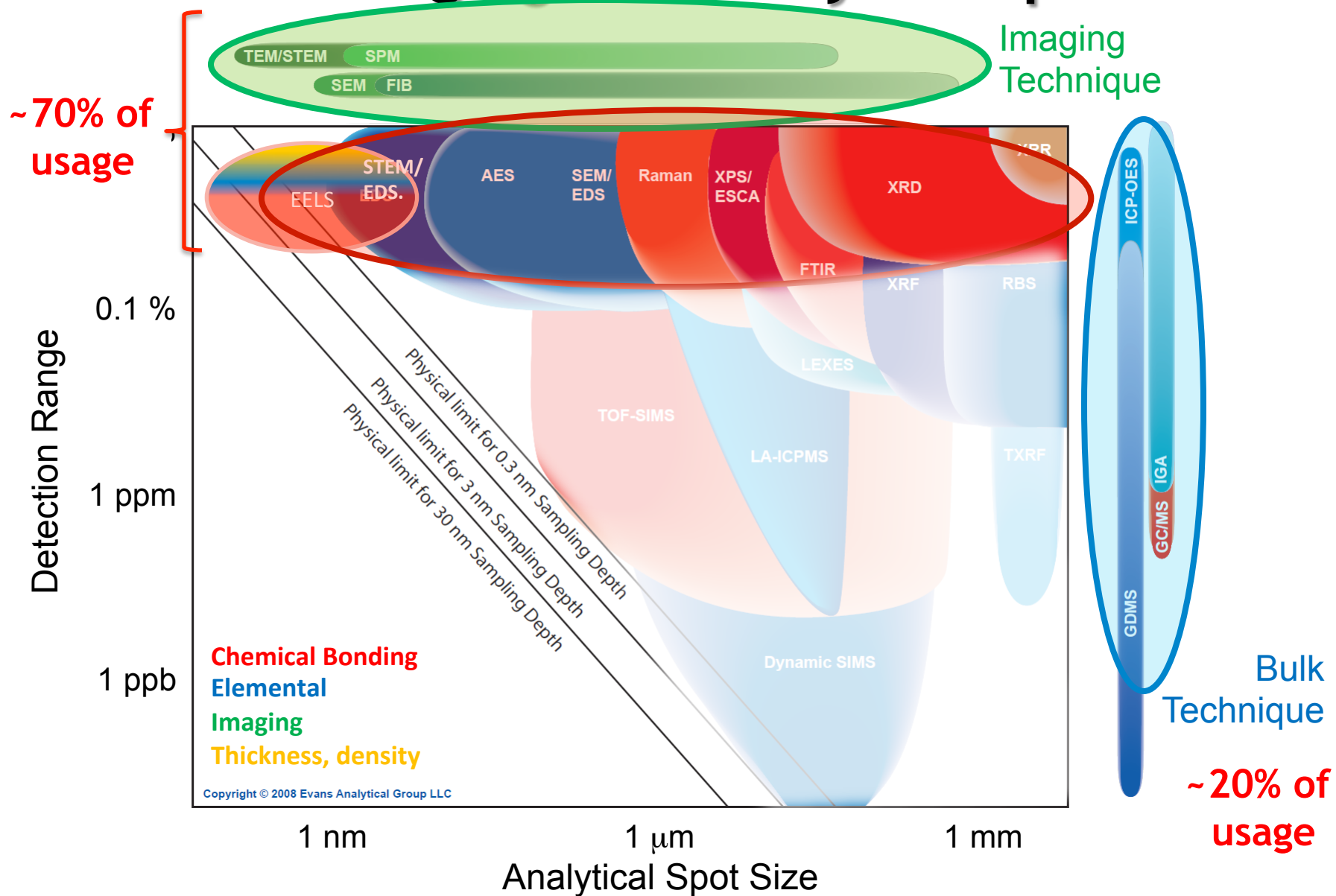
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Facilities Imaging and Analysis Capabilities





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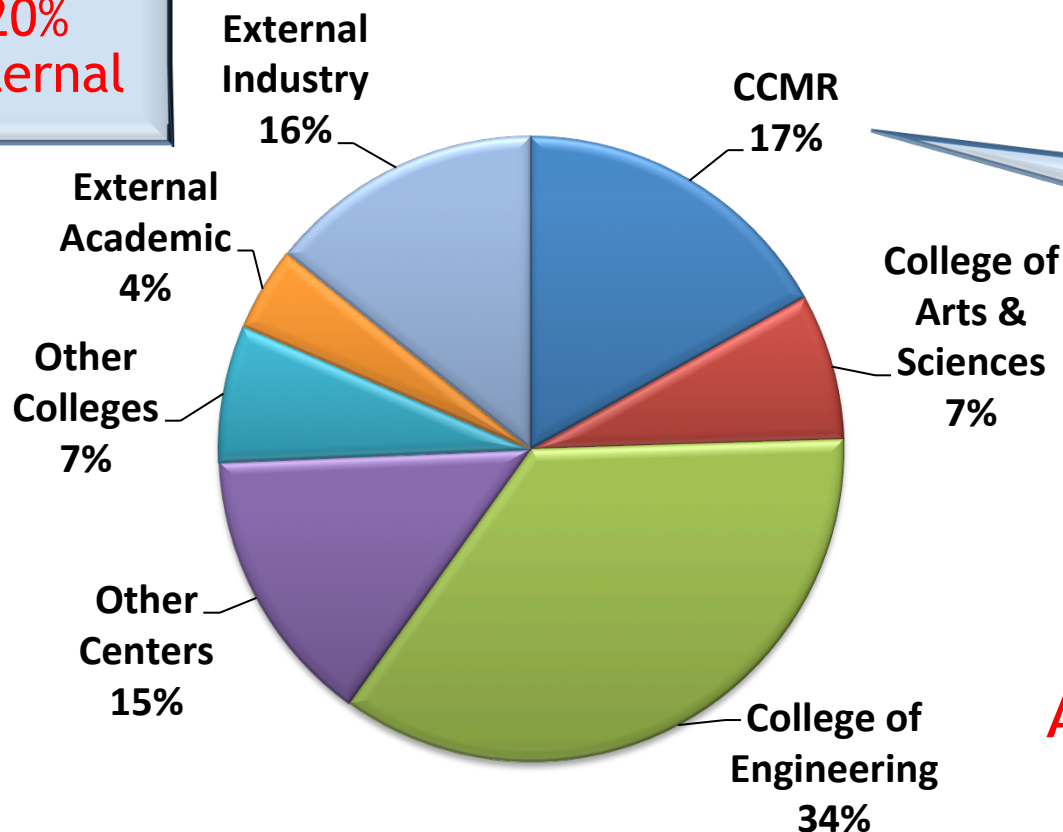
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Facilities Metrics

- 700 users generate \$2,0M/yr
- 9 Managers spend \$2,5 M/yr

20%
external



Recovery
~ 80%

MRSEC,
Cornell:
\$500K

~40% of all
IRG, Seed
expenses

All users pay standard
rates (acad, ind.)



Facilities Rates

- Historical
 - Accepted/ entrenched
 - Input from faculty and prior cost reviews
- Expense and income analysis
 - Per instrument and group of instruments
 - Estimate of time allocation of managers
 - General expenses and overhead allocation
- Strategic importance
 - Support of MRSEC research
 - Affordability (useful data at reasonable cost)
 - Range of equipment
- Elsewhere
 - Established data base of rate information from 80 other organization for 20% of instruments that generate 80% of income
 - Commercial rates are more difficult to get (ask for quotes)

Keeping Facilities Effective

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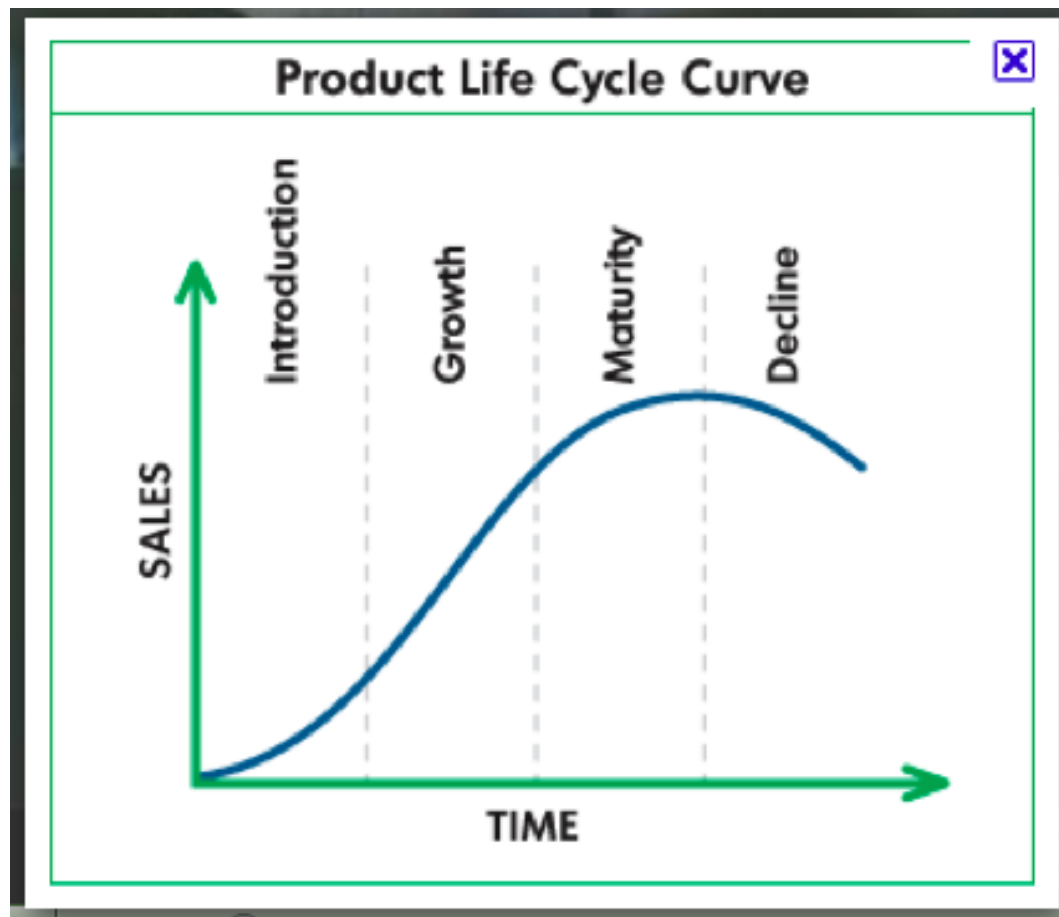
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How unique are facilities?





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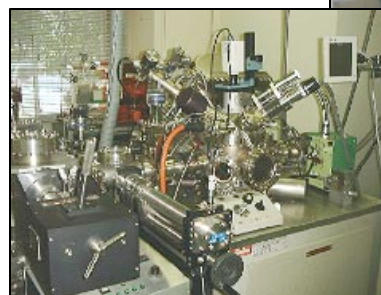
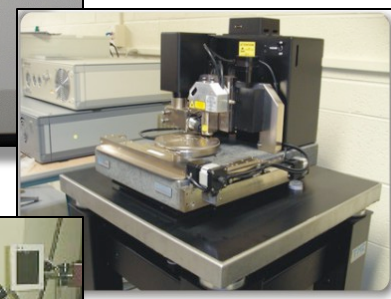
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Keeping Facilities Effective

- 2006: Closed Ion Beam Facility due to very little usage and high cost of ownership
- 2007: Realigned Research Computing staffing with demand
- 2008: Outsourcing of more traditional electronics support
- 2009: Campus wide 5% cut
 - Restructuring of Materials Facility
 - PhD level managers with proven ability to initiate new endeavors and grant writing as main assignment
- 2010: Coral implementation
- Overall staff reduction by 4 FTE
- Strategic investments in:
 - Electron Microscopy, X-ray Diffraction
 - Raman, XPS, thin film, PPMS





Shift in needs

Discontinued or transferred:

- Ion beam
- Bulk processing
- Mechanical testing
- Machining
- Brazing, welding
- Glassware
- Electronics
- Liquid He

New:

- TEM/STEM w/EELS, X-ray
- SEM
- FIB
- X-ray (thin film, mapping)
- XPS
- Raman mapping
- FTIR microscopy
- NSOM
- PPMS
- Thin film deposition
- Micromechanical testing



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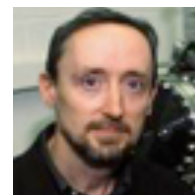
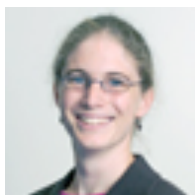
Each Facility has Facility Advisor(s):

- Prof. Geoffrey Coates (Chem)
- Prof. Lara Estroff (MS&E)
- Prof. David Muller (A&EP)
- Prof. Jiwoong Park (Chem)
- Prof. Darrell Schlom (MS&E)
- Prof. John Silcox (A&EP)
- Prof. Kyle Shen (Physics)
- Prof. Bruce Vandover (MS&E)

3 year plans:

- Updated annually
- Usage trends
- Equipment status
- Current needs
- Scientific trends
- Proposal initiatives

**INPUT INTO CCMR
CAPITAL PLANS**





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Capital Allocation

- Annual call for capital equipment proposals (~\$500K)
- Priorities for allocations:
 1. IRG supported requests for facilities equipment
 2. Facility requests, if supported by community
 3. IRG requests
 4. Individual requests
 5. Outside CCMR requests
- Proposals that leverage funds get higher priority
- Written and oral presentation of all proposals
- Voting by CCMR Executive Committee

Investment '05 - '09:

%	MRSEC	Other	Total
IRG/Seed	36%	64%	\$1.7M
Facilities	19%	81%	\$5.4M
Total	23%	77%	\$7.2M

Leverage: ~4x

Investment required:

- Equipment value: ~ \$15 -20M
- 80% income from < 10yrs old
- Required: \$1.5-2.0M/yr
- '05 – '09: \$1.3M/yr



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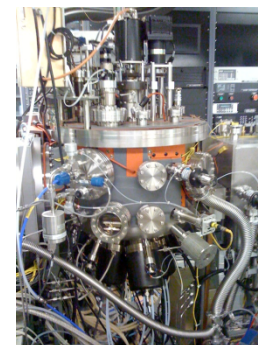


Examples of Leveraged Capital Allocations

- 2011: CNS, faculty contribute to PPMS [Materials Facility](#)
- 2010: Faculty, ERC fund new EELS [Electron Microscopy Facility](#)
- 2009: CVM, CALS contribution (\$130K) for TEM and SEM placement and upgrade in [Electron Microscopy Facility](#)
- 2008: CFCI, KAUST, Faculty member contributions (\$130K) for purchase of powder diffractometer + accessories for [XRD Facility](#)
- 2007: XPS (donated by Kodak) installation and upgrade for [Materials Facility](#)
- 2006: Industry commitment (\$30K Corning+Kodak) for service contract on DualBeam FIB for [Electron Microscopy Facility](#)

Examples of equipment placement by faculty members

- 2009: Sputtering cluster (\$50K) in [Materials Facility](#)
- 2008: Mossbauer Spectrometer (\$80K) in [Materials Facility](#)
- 2007: Ultra STEM (\$1,6M) in [Electron Microscopy Facility](#)
- 2006: Maldi TOF SIMS (\$200K) in [Polymer Facility](#)





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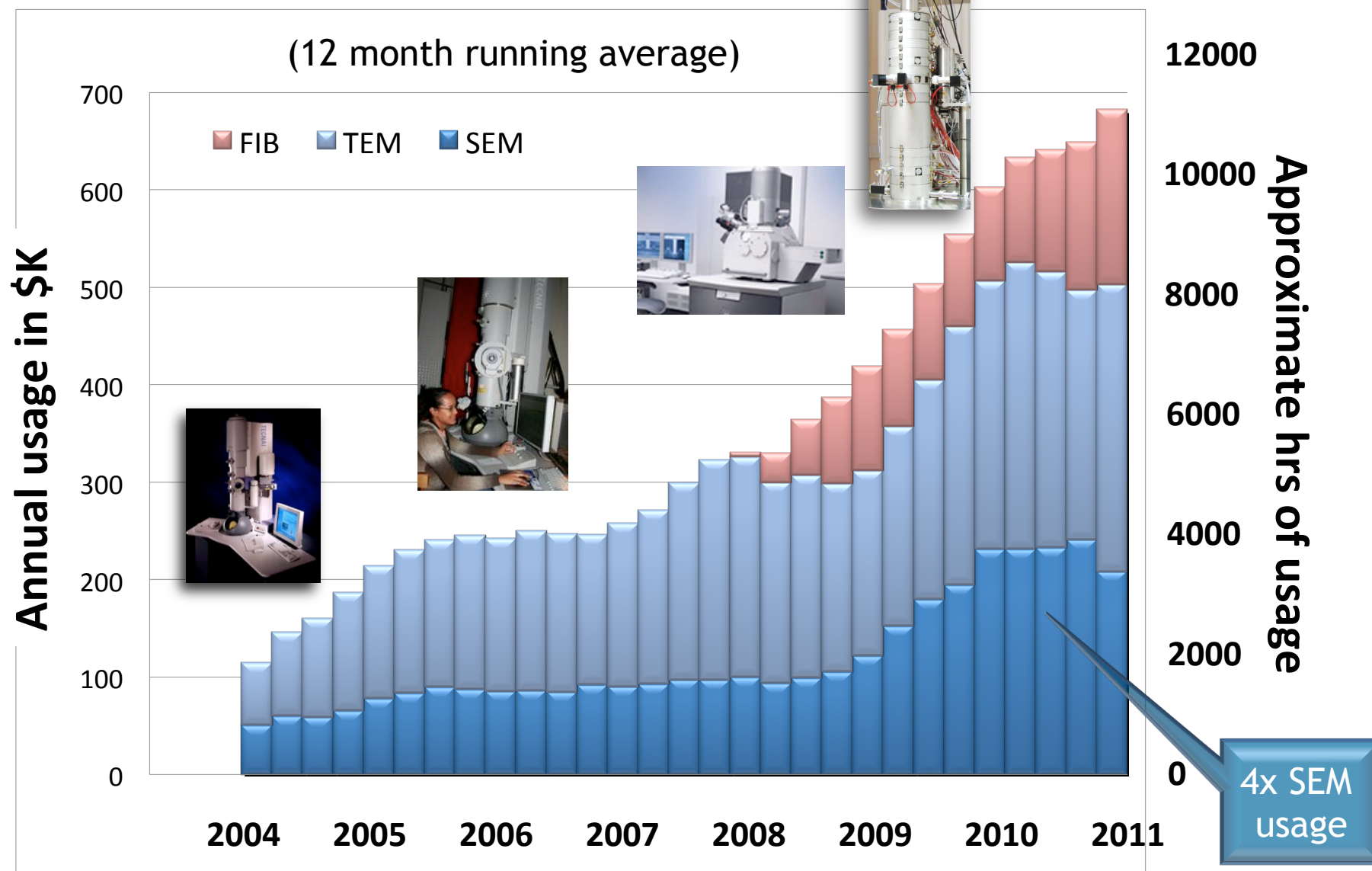
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EM Facility usage





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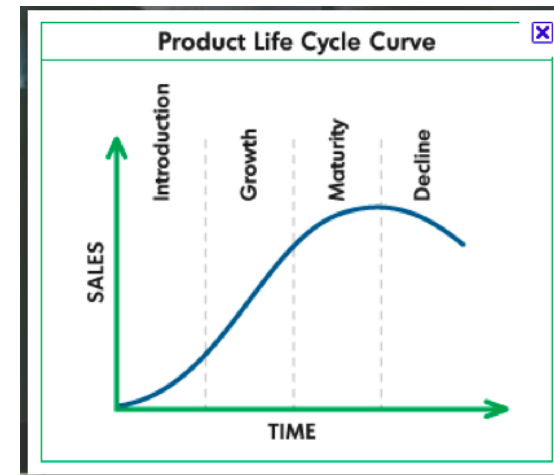


What we think is important

- Willingness to share resources
- Input from faculty to understand new and existing needs
 - 3 yr plans
 - Faculty advisors
 - Annual capital RFP
- Leverage capital resources
 - Grants
 - MRSEC and CU funding
 - Faculty
 - Centers and Dept
- Good managers
 - Know-how (cutting edge)
 - Customer service
 - Interpersonal skills

What we think is important

- Actively manage the entire life cycle of your services
 - Focus on core strength
 - Discontinue services not used
 - Balanced portfolio
- Active marketing
 - Seminars
 - Symposia
 - Courses
 - Facilities 101
 - Industrial Outreach program
- Reduce cost
 - Overhead
 - Maintenance



CCMR Shared Facilities Repair and Maintenance Cost

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Repair and maintenance cost

Instr.	2003		2004		2005		2006		2007		2008		2003 - 2008		Contr/ Cost%
	Cost	Contr	Cost	Contr	Cost	Contr	Cost	Contr	Cost	Contr	Cost	Contr	Cost	Contr	
A	12595	13500	7674	13674	13735	12817	5816	11822	7345	9813	4261	10706	51426	72332	71
B	31790	28000	31350	28362	25470	27737	20850	28795	16167	23900	26137	28347	151764	165141	92
C	0	0	0	0	33652	19795	10811	21332	4129	17706	5000	18326	53592	77159	69
D	0	500	0	500	0	500	0	500	0	390	0	404	0	2794	0
E	3780	9500	3150	9500	0	0	0	7218	0	4726	0	4891	6930	35835	19
F	0	7613	0	7613	0	7613	0	7613	0	6018	0	6229	0	42699	0
G	0	0	0	0	0	0	0	0	0	0	13921	21748	13921	21748	64
H	0	0	0	0	0	0	9338	0	62822	0	0	0	72160	0	
I	4725	11145	16000	11145	13082	11145	0	12521	20690	10344	20000	10706	74497	67006	111
J	7260	20000	0	20000	5839	20000	4993	20000	23308	20000	4338	19659	45738	119659	38
Total	60150	90258	58174	90794	91778	99607	51808	109801	134461	92897	73657	121016	470028	604373	78
													78338	100729	

Trends:

- Actual cost lower for most instruments (**exceptions**)
- Total annual actual cost always lower than contracts
- Higher cost in first few years
- Potential savings 25%



Repair and maintenance cost

Self insurance:

- Implemented in 2008-2009
- Start with contract rates
- Current balance better than expected

Culture shift:

- More cost-aware
- In-house repair (shorter down-time)
- Change in responsibility