8. BUDGET AND STAFFING

INTRODUCTION

The National High Magnetic Field Laboratory (NHMFL) operates with funding provided by federal, state, institution, and industry sources. The lab staff has been successful in securing individual research grant funding for specific areas of research from federal, state, and local agencies. The additional awards offset the operating costs by shifting costs during the periods of time in which staff is engaged in individual research activities. The lab has also actively pursued opportunities for industry support through collaborative efforts. While the lab receives funding from numerous sources, the primary funding source for operation of the NHMFL remains the National Science Foundation (NSF).

NSF CORE BUDGET

In 1996, The National Science Foundation (NSF) awarded the second five-year research grant to the National High Magnetic Field Laboratory (NHMFL) in the total amount of $87,500,000. The funding provided a level annual budget of $17,500,000 per year for the five-year period. In the early years of the grant, the actual dollars expended was less than the budget provided. In the last two years of the NSF grant, however, the budgetary requirements exceeded the annual NSF funding. The NHMFL utilized institutional funds and prior year surplus to offset this funding deficit. The non-recurring institutional support provided during FY 2000 is explicitly indicated on the individual budgets and was provided to help cover budget deficits. Table 1 provides the cumulative NSF budget and expenses by expense classification through 12/31/00.

Table 1. NSF Budget and Expenses*

Expense Classification	Total Budget Dollars	*Dollars Expended	*Dollars Encumbered	*Total Dollars Expended & Encumbered
Salaries, Wages, & Benefits	26,656,350	23,536,300	15,690	23,551,990
Permanent Expenses	12,724,300	7,249,880	144,000	7,393,880
Other Direct Expenses	34,394,810	40,099,175	1,669,280	41,768,455
Total Direct Cost	73,775,460	70,885,355	1,828,970	72,714,325
Indirect Cost	13,724,540	14,755,410	30,265	14,785,675
Total Cost	87,500,000	85,640,765	1,859,235	87,500,000
Program Income	1,352,960	1,352,960		1,352,960

** Data was compiled from NHMFL internal financial records and represent unaudited financial estimates*

NHMFL Matching Commitment

The NSF grant includes a matching commitment by the State of Florida. The state commitment to provide matching for the NSF funding is based on the original commitment of recurring funds in the amount of $4,200,000. This requirement is increased annually based on the legislatively approved increases for personnel costs.

For FY2000, the State of Florida again elected to provide additional funds for the operation of the lab programs. The NHMFL utilizes the additional state resources as available cost sharing funds for additional funding opportunities. Table 2 presents the current State of Florida matching requirements for FY2000.

Table 2. State of Florida Matching Requirements

	FY 2000 Matching ($)
State of Florida recurring funds cost sharing	$4,667,250
Indirect cost (46.5%)	$2,170,270
Total State Commitment	$6,837,520
Overhead rate adjustment for negotiated rate of 48%	$70,000
Total State & Institutional Cost Sharing	$6,907,520

Additionally, the Los Alamos National Laboratory makes a contribution to the costs of the NHMFL Pulsed Field Facility. In FY2000, the contribution included $500,000 toward facility expenses and $290,000 in support of center management. Additional non-quantified support was provided in the form of the waiving of demand charges for electricity used by the NHMFL facility.

NSF Renewal Funding for FY 2001-2005

The National Science Board approved the NHMFL renewal award, in the amount of $117,500,000, at its meeting on October 19, 2000. The renewal period will be from January 1, 2001 through December 31, 2005. Table 3 presents the NSF funding comparison for the current fiscal year and fiscal year 2001. It also details the current five-year grant period funding with the renewal funding levels for each program. The most significant increase to the budget included a reserve that will be used for currently planned equipment purchases.

Table 3. NSF Budget Comparison, FY2000 and FY2001

Division/Program	FY2000 Budget *	%	FY2001 Budget *	%	FY 1996 - 2000 5 Yr NSF Summary	%	FY 2001 - 2005 5 Yr NSF Summary	%
Director	186,500	1.00%	636,160	2.99%	3,110,550	3.39%	3,353,010	2.75%
CIRL	94,870	0.51%	244,970	1.15%	479,691	0.52%	1,293,600	1.06%
Reserve (2)	0	0.00%	-952,002	-4.48%		0.00%	6,671,960	5.47%
Facilities & Admin	1,059,180	5.65%	1,785,800	8.40%	7,799,663	8.51%	9,425,500	7.72%
Instruments & Operations	6,057,645	32.33%	6,673,380	31.38%	25,315,912	27.61%	35,277,500	28.90%
Magnet Science & Technology (4)	4,660,040	24.87%	4,388,730	20.64%	22,007,181	24.00%	19,147,600	15.69%
Science (3)	490,855	2.62%	1,575,830	7.41%	7,273,389	7.93%	8,360,050	6.85%
LANL	4,232,650	22.59%	4,572,650	21.50%	19,098,427	20.83%	26,476,850	21.69%
CIMAR	302,260	1.61%	588,845	2.77%	889,361	0.97%	4,828,070	3.96%
ICR Facilities**	1,236,496	6.60%	1,266,064	5.95%	4,200,000	4.58%	4,554,220	3.73%
UF	416,000	2.22%	485,637	2.28%	1,525,825	1.66%	2,665,860	2.18%
Total	18,736,496		21,266,064		91,700,000		122,054,220	

* *Budget amounts are inclusive of overhead distribution by program.*

** *CIMAR is inclusive of NSF Chemistry Division award in the amount of $1,206,338 (FY2000), $1,266,064 (FY2001), $1,056,779 (FY2002), and $994,881 (FY2003).*

PROGRAM BUDGET DISCUSSION

FY2000 was the final year of the current grant award for funding from the National Science Foundation. The total NSF budgetary allocation for FY2000 was $17,500,000. The NHMFL also receives an annual operating budget from the State of Florida. In FY2000, the state budget was $6,235,500. State revenue offsets of royalties and work for others provided an additional spending amount of $200,000. Additionally, $886,000 was provided from institutional funds to offset the initial FY2000 NSF budget deficit. The NHMFL internally allocates the annual budgets by program area.

For FY2000, Table 4 details the budget allocations and actual expenditures by program for both NSF and state E & G funding.

Table 4. NSF and State Budget Allocations and Actual Expenditures, FY2000*

(Dollars in 000's)

Program	NSF Budget	State Budget	Total Budget		NSF Actual**	State Actual**	Total Actual
Director	125.6	1,837.0	1,962.6		197.6	1,187.3	1,384.9
CIRL	63.2	372.9	436.1		61.3	128.5	189.8
Facilities & Admin	771.7	522.7	1,294.4		910.0	699.8	1,609.8
Instruments & Operations	4,766.9	236.3	5,003.2		4,459.4	352.8	4,812.2
MS & T	3,583.7	945.7	4,529.4		3,847.1	772.9	4,620.0
Science	444.9	1,178.8	1,623.7		1,601.9	1,107.7	2,709.6
LANL	4,232.7	52.7	4,285.4		4,396.8	83.5	4,480.3
CIMAR	203.5	883.6	1,087.1		256.8	1,074	1,566.4
ICR Facilities***	1,236.5	297.9	1,534.4		1,299.9	295.6	1,595.5
UF	296.3	110.6	406.9		1,072.7	60.8	1,133.5
Overhead/Unallocated****	3,011.5		3,011.5		3,597.8	275.1	3,872.9
Total	18,736.5	6,438.2	25,174.7		21,701.3	6,038	27,974.9

** Data was compiled from NHMFL internal financial records and represent unaudited financial estimates. State funding includes State of Florida E & G budget allocation only.*

*** Includes actual expenditures and encumbrance balances at the end of FY2000. NSF Actual exceeded the FY2000 budgetary allocations. The NHMFL utilized institutional funds and prior year surplus to offset this funding deficit.*

**** The ICR facilities is supported primarily by a NSF Chemistry Division award.*

*****Overhead budget is not distributed to programs. State Unallocated includes encumbered salaries and start-up expenses funded from the state budget.*

Director's Office

The Director's Office includes the Director, Deputy Director and their administrative assistants. In addition, the Office of Government and Public Relations is included in the Director's Office. Government and Public Relations has been realigned for FY2001 to include a new Laboratory Information Management group that is a consolidation of the functions of publications, web master, graphics and publication support that were carried out in other units. The Visiting Scientist's program provides funding for scientists to conduct research utilizing the NHMFL facilities. Proposals are internally peer reviewed and awards are made on a first-come basis based on input provided through the internal review process.

DIRECTOR'S OFFICE FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Director	32,000	476,980
Deputy Director	10,000	301,750
Government & Public Relations	83,500	518,500
Visitor's Program		300,000
Director's Research		126,650
Reserve		249,340
Total	125,500	1,973,220
* Institutional funding provided		136,220

Center for Integrating Research and Learning (CIRL)

This unit was formerly included in the Director's Office, but as the program has expanded, it has been set up as a separate cost center. CIRL supports programs in curriculum development, distance learning and teacher education with the primary focus on enhancing science education at all levels and promoting public awareness. CIRL administers the Research Experience for Undergraduates (REU) program that has been extremely successful over eight years. The Research Experience for Teachers (RET) is also coordinated and run by the Center. The RET program has fit very effectively with the summer REU students. All mentorships are organized by CIRL for middle school students. CIRL is also the focal point for organization of the NHMFL Annual Open House and other tour activities for K-12 groups and the public. The Optical Microscopy Resource Center (OMRC) is another program operated as part of the NHMFL research and learning efforts. The OMRC has been hugely successful and received national recognition. The costs associated with the microscopy research program are offset with funding from other sources.

CENTER FOR INTEGRATING OF RESEARCH AND LEARNING FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Education	63,150	173,890
REU Program	0	65,000
Optical Microscopy		210,900
Total	63,150	449,790
*Institutional funding provided		76,890

Facilities and Administration

Facilities and Administration includes general administrative functions for the lab including personnel, budget, accounting, payroll, procurement, accounts payable, grant administration, and media activities. Facilities include maintenance of the magnet power supplies and cooling systems, helium system, and the remainder of the facilities with the exception of the grounds, janitorial, and some HVAC and plumbing preventative maintenance. The Facilities group also handles small interior renovations and modifications needed to support research activities. Funding for the Facilities group is split between NSF, state and institutional funds. NSF funding is used for core-related activities while state and institutional funds are used for general facility maintenance and modifications.

FACILITIES AND ADMINISTRATION FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Administration	98,580	1,215,470
Facilities	508,800	706,600
Safety	164,270	
Total	771,650	1,922,070
* Institutional funding provided		1,399,370

In FY2001, all of the budget, accounting, and financial analysis functions are being consolidated in the Director's Office with the Chief Administrative Officer and Chief Budget Officer. These two positions provide the Director with greater cost accounting and budget control over the many different funding sources and programs. In addition, the Chief Administrative Officer is responsible for purchasing, travel, disbursements, and capital equipment inventory.

Instrumentation and Operations

This unit, headed by the Director of DC Fields Operations, is responsible for the operation of the DC magnet systems at Tallahassee, as well as, the Millikelvin facility. This unit also provides operational machine shop, electronics, and computer networking support for the entire laboratory. Most of the staff is dedicated to supporting user activities from the technical level to assistance from instrumentation scientists. This group focuses on keeping abreast of the cutting edge instrumentation specialties and improving the performance level of user instrumentation through the development of new approaches to measurements. The Instrumentation and Operations group also helps coordinate annual meetings of the NHMFL Users' Committee and other interface activities with the user community.

INSTRUMENTATION AND OPERATIONS FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Administration	121,930	319,750
Computer Services	268,225	
Cryogenics	572,480	
Electronics	245,365	
Magnet Operations	2,117,560	
Mechanical Instruments	507,620	
User Services	933,770	71,040
Total	4,766,950	390,790
* Institutional funding provided		154,490

Magnet Science and Technology

The Magnet Science and Technology (MS&T) group is responsible for the design and engineering of the DC, pulsed, and advanced superconducting magnets, such as the wide-bore 900 MHz NMR magnet. This group has brought together some of the best and brightest talent ever assembled to advance magnet technology and magnet materials. MS&T has broad interactions with the private sector, other national laboratories, and international institutions involved in high field magnet research and development. Future advances in magnet technology will be heavily dependent on advances in materials, specifically high strength, high conductivity normal conductors and high strength, high performance superconductors; high transition temperature superconducting conductors and reinforcement materials that are critical to overcome the enormous forces reflected in high field magnet design. The specific programs in MS&T include Administration, which includes general management, administrative, and some engineering staff and supplies; Resistive Magnets; High Field Systems, which includes NMR systems; Materials Development and Characterization; Pulsed Magnets; Cryogenics Operations and In-house Research and Development; HTS Magnets and Materials Development; and MS&T analysis.

MAGNET SCIENCE & TECHNOLOGY FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Administration	685,740	470,600
Resistive Magnets	855,260	
High Field Systems	1,315,120	280,460
Materials Development	245,270	263,360
Pulsed Magnets	131,630	
Cryogenics	113,770	22,550
HTS Magnets	114,780	79,280
Analysis	122,030	154,080
Total	3,583,600	1,270,330
* Institutional funding provided		324,630

Science Program

The NSF funding for the science and facilities development program are primarily distributed through the In-House Research Program (IHRP). A small amount of funding is utilized to cover the administration of the program and to provide assistance for the Director of the IHRP. The Director of the IHRP serves a two-year term, and the position rotates among the three institutions. During the current period, the program is headed by Dr. Al Migliori from the NHMFL Pulsed Field Facility at Los Alamos National Laboratory. The Condensed Matter & Theory group in Tallahassee assists and provides administrative support with proposal solicitations and reviews. IHRP proposals must include an internal investigator from one of the three participating institutions as Principal

SCIENCE FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Administration	10,000	376,870
In-House Research Program	379,700	56,000
Condensed Matter Theory		253,760
Condensed Matter Experimental		412,150
Geochemistry	55,090	151,020
Total	444,790	1,249,800
* Institutional funding provided		71,000

Investigator but participation from external users as Co-Principal Investigators is strongly encouraged by the NSF and NHMFL. The proposed research work must utilize and advance facilities and support is restricted to two years or less. Proposals that support young scientists and/or support bold new research areas that have the possibility of opening new frontiers are strongly encouraged.

Pulsed Field Facility – Los Alamos

The NHMFL Pulsed Field Facility is sited at Los Alamos National Laboratory (LANL) and operated under a subcontract agreement between Florida State University and the Department of Energy. Funding for the NHMFL Pulsed Field Facilities and Administration includes the facility overhead charges. The Pulsed Field Facility provides technical and instrumentation support for the user community. The staff of the NHMFL Pulsed Field Facility, in cooperation with the user community, also devotes considerable attention to the development of new research capabilities and instrumentation responding to the unique requirements imposed by the rapidly changing magnetic fields and vibrations characteristic of these systems. The NHMFL Pulsed Field Facility staff works closely with members of the NHMFL Magnet Science and Technology group in Tallahassee to advance pulsed magnet technology and materials for these unique systems. Special staffing is also required to maintain the 4.0 MJ capacitor bank and the 1.4 GVA generator used to power the magnets available at this facility.

PULSED FIELD FACILITY LOS ALAMOS FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Facilities & Admin	2,316,350	
User Operations	1,402,440	52,700
60 T Pulsed Magnet	513,861	
Total	4,232,651	52,700
* Institutional funding provided		0

High B/T Facility

The High B/T Facility is located at the University of Florida and is housed in the existing Microkelvin facility. A special bay has been retrofitted in the Microkelvin laboratory with a 15/18 T magnet designed for ultra-low temperature research, i.e. research at a few hundred microkelvin.

HIGH B/T FACILITY UNIVERSITY OF FLORIDA FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Administration		110,650
High B/T User Support	71,925	
Total	71,925	110,650
* Institutional funding provided		0

Center for Interdisciplinary Magnetic Resonance

CIMAR represents all areas of magnetic resonance techniques and has made significant advances in building a user program that involves interdisciplinary activities with Physics, Geochemistry, Chemistry, and Biology. The program focuses on nuclear magnetic resonance (NMR), electron magnetic resonance (EMR), ion cyclotron resonance mass spectroscopy (ICR-MS), and magnetic resonance imaging and spectroscopy (MRI/S). The facilities within CIMAR provide unique instrumentation and capabilities to support a wide variety of research areas and are open to all qualified users. CIMAR has received only modest support from the NSF core grant. Most of the program activities have been supported with state and institutional funds. A portion of the NMR spectroscopy and imaging activities are pursued at the Advanced Magnetic Resonance Imaging and Spectroscopy Facility (AMRIS) located at the McKnight Brain Institute at the University of Florida.

CENTER FOR INTERDISCIPLINARY MAGNETIC RESONANCE FY2000		
Program	NSF Budget $	State & *Institutional Budget $
Administration	26,510	116,380
NMR program	126,895	427,270
ICR Program*	1,266,064	297,900
ESR Program	50,000	339,970
AMRIS	224,385	
Total	1,693,854	1,181,520
* Institutional funding provided		0

*The ICR-MS facilities are primarily supported by a separate award from the Chemistry Division of NSF.

Basis of Estimate of Program Budget

The program budgets were prepared in accordance with the following criteria:

Budget Units: The NSF and state budgets are allocated to the NHMFL programs. There is one sub-contract for facilities and activities at Los Alamos National Laboratory, Los Alamos, NM. The overall operations of the NHMFL are governed by the Executive Committee which is responsible for developing recommendations to the Director for allocation of budget dollars to programs.

Wage and Salary Rates: Where possible, actual salary rates have been used in the cost calculation. In some instances, the average salary rate may have been used for vacant and Ops (temporary) positions.

Overhead Rates: The Florida State University current approved overhead rate of 46.5% has been used for all costs at Tallahassee. Current approved institutional overhead rates have been used for costs at University of Florida (44.5%) and Los Alamos (49.4%).

Overhead Base: At FSU and UF, overhead is applied to all costs except the following:

- Permanent Equipment
- Undergraduate, Graduate, and Ph.D. Programs (CIRL)
- Electric Power for magnet operations
- Subcontracts (excluding the first $25,000 of each subcontract).

At LANL, full overhead is applied to all costs except for projects designated as capital projects where a reduced overhead (10%) is applied to all costs.

Fringe Benefits: Fringe benefits for Florida personnel are based on average actual costs of fringe benefits for permanent employees (31%) and temporary employees (10%). Fringe benefit costs for LANL employees are included in the average salary rates for each class.

Administrative and Facility Maintenance Costs: Certain administrative and facility maintenance costs are accrued solely for the benefit and function of the NHMFL. These costs are included as direct costs in the budget estimates as allowed by the OMB regulations.

In-House Research Program Awards: The designated budget for the IHRP is inclusive of institution overhead. Since the actual overheads vary depending on the nature of the program and the institution involved, actual overheads are determined at the time of award within the total IHRP budget.