



**Calhoun: The NPS Institutional Archive**  
**DSpace Repository**

---

Department of Applied Mathematics

Applied Mathematics Department Publications

---

2010-06

## Department of Applied Mathematics Academic Program Review, Self Study / June 2010

Borges, Carlos F.

Monterey, California, Naval Postgraduate School

---

<https://hdl.handle.net/10945/34969>

---

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

*Downloaded from NPS Archive: Calhoun*



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

**Dudley Knox Library / Naval Postgraduate School**  
**411 Dyer Road / 1 University Circle**  
**Monterey, California USA 93943**

<http://www.nps.edu/library>



DUDLEY KNOX LIBRARY  
NAVAL POSTGRADUATE SCHOOL  
<http://www.nps.edu/Library/>



**Applied Mathematics  
Library Support for Academic Program Review  
June 2010**

The Dudley Knox Library's mission is to *provide an information rich environment supporting the academic and research pursuits of the Naval Postgraduate School and its partners*. As the university library, we are expected to meet standards established by the Naval Postgraduate School's principal accrediting body, the Western Association of Schools and Colleges (WASC), as well as the accreditation standards set for specific academic programs such as ABET (formerly the Accreditation Board for Engineering and Technology).

The Library's annual budget of approximately \$5.2 million supports a rich combination of content collections, library services, and 30 FTE staff dedicated to facilitating graduate education and research in NPS subject areas. DKL anticipates and responds to current and emerging requirements, and seeks innovative and creative ways to provide scholarly information to patrons by investing in leading edge technology and services. In the current global economy, no library stands alone. DKL actively partners with federal, special, and academic libraries—particularly the Consortium of Naval Libraries; the National Research Library Alliance; and a multi-type library consortium (Pacific Library Partnership)—to leverage limited budget dollars and invest in collaborative acquisitions, joint-licensing agreements, and resource sharing that extend content offerings to NPS patrons beyond what we could afford on our own.

Today's university libraries have a three-fold mission: they are gateways to information; provide physical and virtual places for study, research and learning; and our personnel offer a wide range of services that support the academic and research enterprise. This report documents how the Dudley Knox Library supports the highly related and integrated Applied Mathematics curriculum and research at the Naval Postgraduate School (NPS).

### **Space**

The Library building (100,000 sq ft), is open 7 days a week for an average 86 hours per week (we offer additional extended hours during finals week). In addition to physical and virtual collections and services, the Library provides a wide variety of individual- and group-collaborative spaces, computers, and peripherals for resident student use:

- 134 individual study carrels
- 19 collaborative group study rooms (6 equipped with interactive audio visual systems)
- 4 designated areas for large group study and collaborative space
- 3 conference rooms (with interactive audio visual systems)
- 54 public access computers and 23 circulating laptops
- 8 networked multi-function devices (copy, print, scan, email, fax)
- 2 standalone microformat reader/printers and 2 color scanners
- 110 storage lockers

- and miscellaneous peripherals such as: digital voice recorders; television monitor with VHS and DVD players; headphones; network cables; patron self-checkout machine; and 2 plasma public messaging screens.

The Library is virtually open 24/7 through proxy server and Virtual Private Network access to our robust website [<http://www.nps.edu/Library>] and web-searchable resources. Onsite and remote access extend the Library’s ability to serve NPS students (resident and distributed learners) and faculty, anywhere in the world from any time zone.

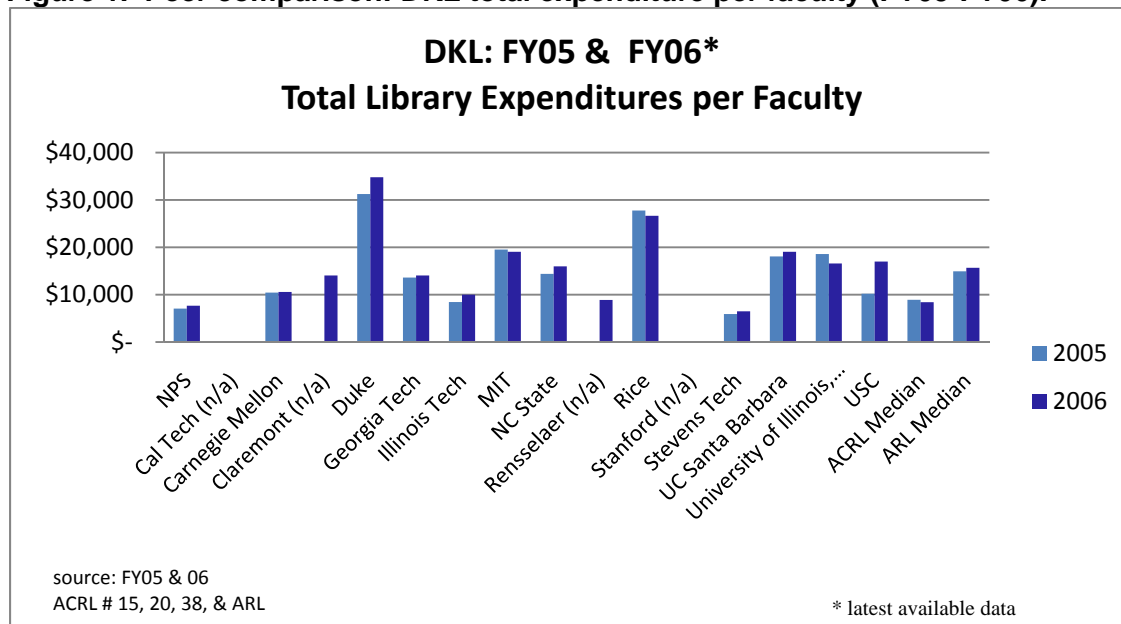
Restricted Resources and Services (RRS), a separate “classified” library within the DKL building, provides a full range of collections, equipment, networks, meeting spaces, lockers and librarian-provided services for “limited distribution, restricted, or classified work up to the SECRET level”. Authorized patrons have access to the RRS library during all hours that the Library is open (86 hours/week).

The Library shares space in the DKL building with several organizations whose presence provides collaborative opportunities for librarians, students, faculty, and staff. Tenants include: Center for Educational Design, Development, and Distribution (CED3); Faculty Development; Homeland Security Digital Library; and the Protestant Chaplain.

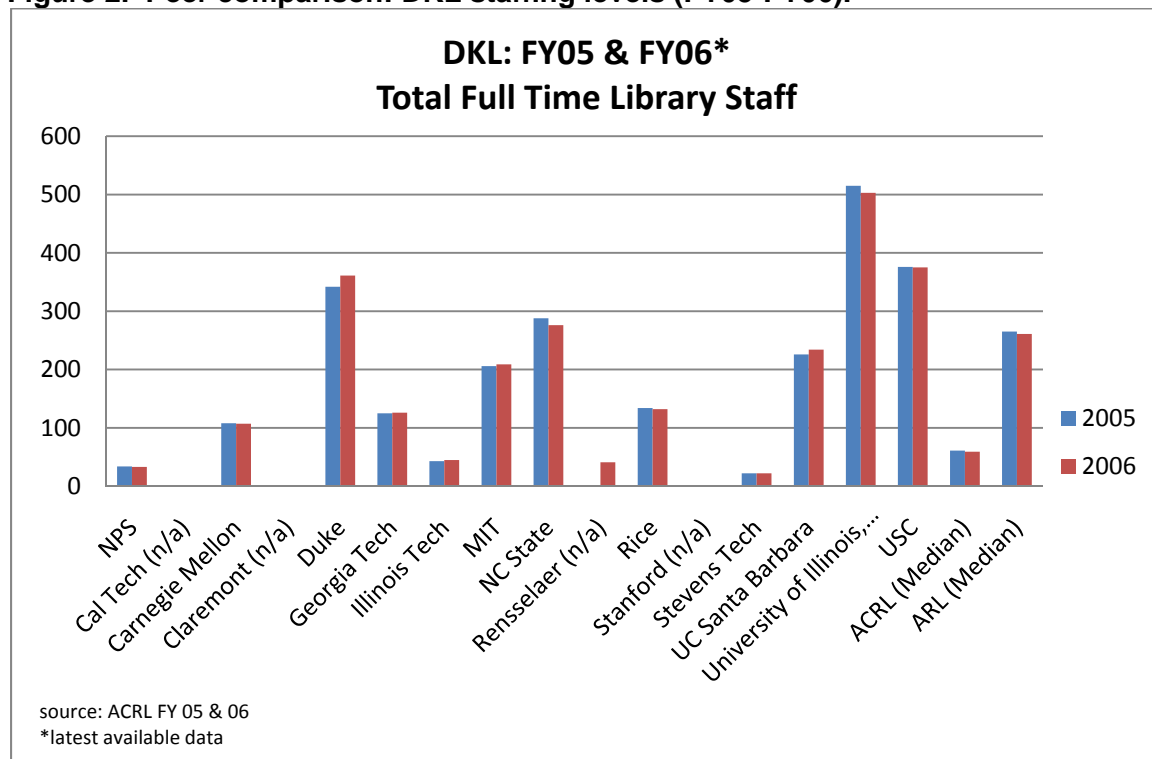
## Peer Comparisons

In 2008 NPS worked with outside consultants to identify an appropriate set of peer universities against which we could benchmark NPS programs and activities. Figure 1 compares DKL budget expenditures per faculty and Figure 2 shows Library staffing levels against our 16 peer institutions and 2 national standards, ACRL (Association of College and Research Libraries), of which DKL is a member, and the ARL (Association of Research Libraries).

**Figure 1. Peer comparison: DKL total expenditure per faculty (FY05-FY06).**



**Figure 2. Peer comparison: DKL staffing levels (FY05-FY06).**



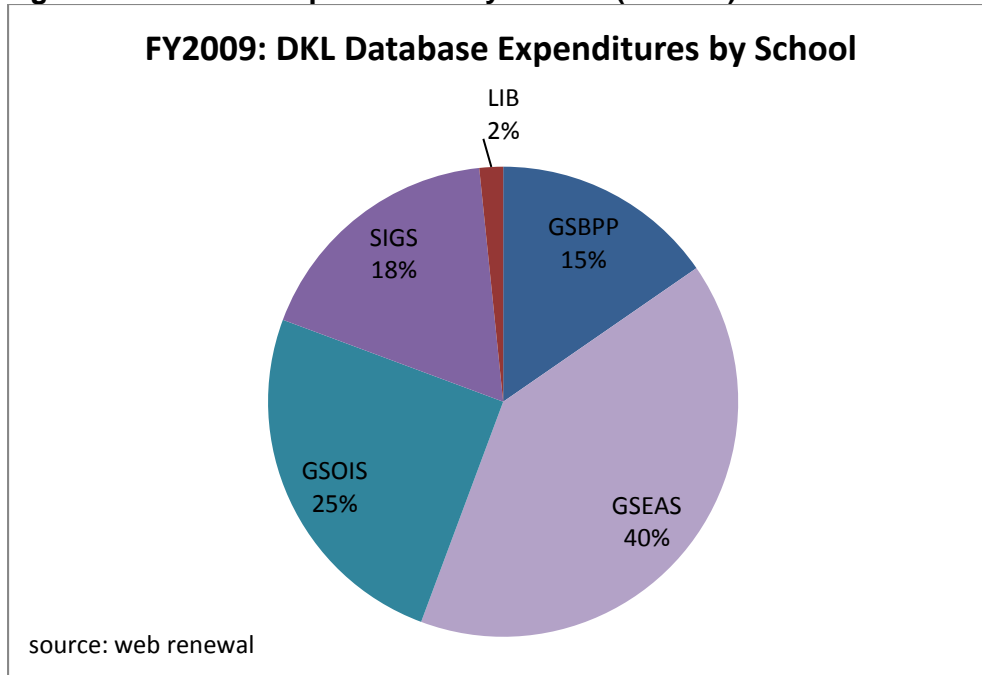
## Collections

DKL currently spends \$1.71 million on content (35% of the total library budget): 55% for journals, 43% for electronic (e-) databases (full-text resources, e-books, and abstracting/indexing services), and 2% for print monographs. The Library collection is one of the primary assets supporting NPS educational and research efforts. The main collection is comprised of print and e-monographs (books, conference proceedings, government documents, and technical reports), journals, theses, dissertations, professional reports, and maps/nautical charts. An online catalog provides 24/7 access to these materials. DKL shares bibliographic records with the international OCLC database and NPS deposits theses, dissertations, and professional reports with the Defense Technical Information Center in order to make NPS intellectual property broadly available and freely accessible.

A separate facility in the Library, Restricted Resources and Services, houses a secure collection of classified and limited distribution resources and provides all services found in the main library albeit for authenticated users only. DKL has also been a selective federal depository since 1963 and makes government documents freely available via our catalog or to anyone using the Library.

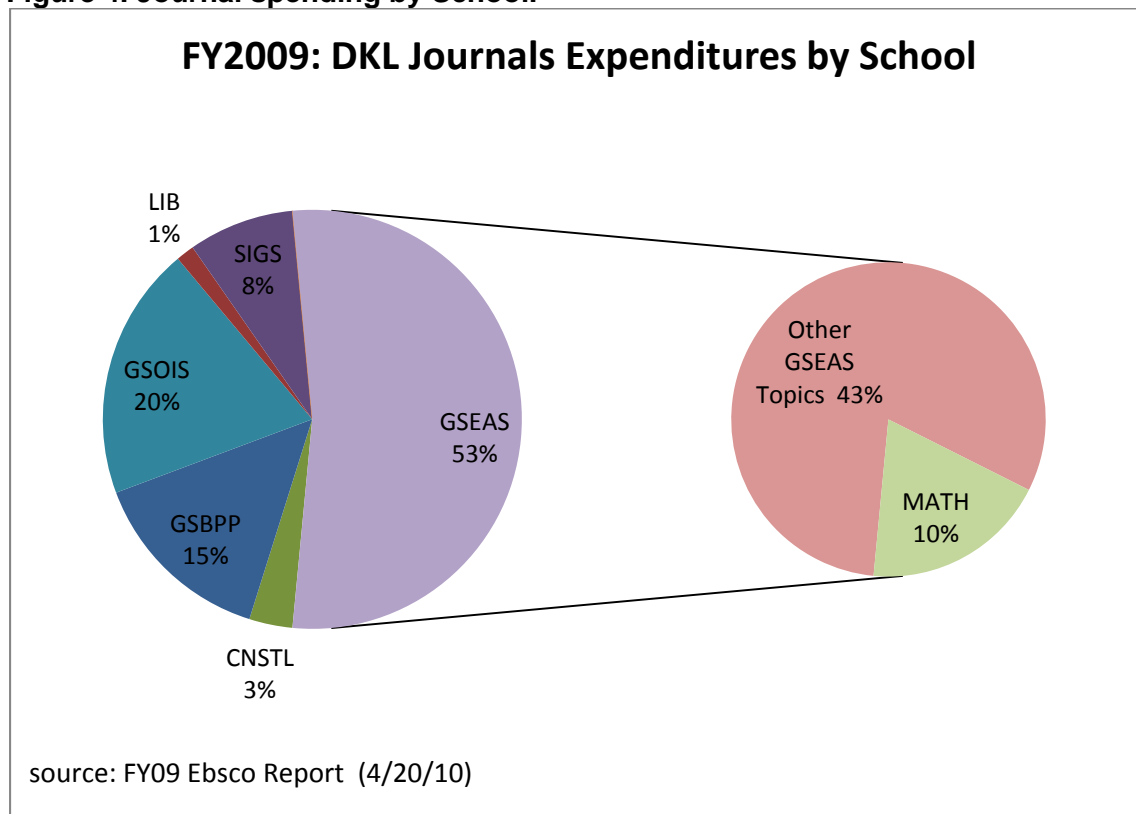
**Databases:** We offer access to more than 140 online databases, many containing full-text resources. Those of particular interest to Applied Mathematics include: *MathSciNet*, *Society for Industrial and Applied Mathematics (SIAM) Journals Online*, *Torpedo Ultra*, and the *Web of Science (Web of Knowledge)*. We also provide many other scientific and technical databases (see Appendix A). 65% of our expenditures for databases in FY 2009 went for GSEAS and GSOIS to provide the engineering, science and technology databases (Figure 3).

**Figure 3. Database Expenditures by School (FY2009)**



**Journals:** DKL aggressively licenses online journals that support NPS curricular and research needs. 53% of our journals budget is spent on scientific/technology titles and approximately 10% of that is devoted to Applied Mathematics (Figure 4). We offer full-text access to a wide range of society publications such as SIAM, Institute for Operations Research and the Management Sciences, as well as titles from major commercial publishers (Table 1). As part of our strategic plan we license journal and technical back files as year-end funds make this possible to provide access to scholarly information “anytime anywhere”.

**Figure 4. Journal spending by School.**



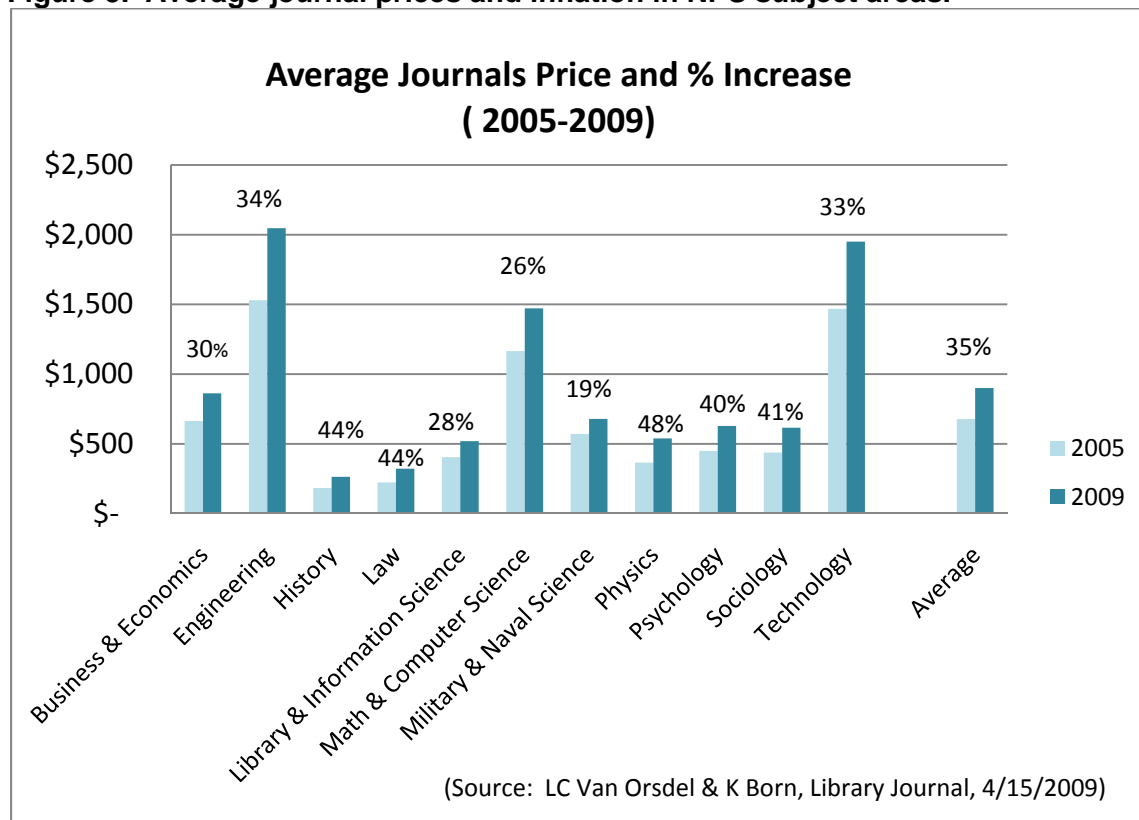
**Table 1. DKL e-journals of interest to Applied Mathematics (2010).**

Subject	# Titles
Computer & Information Science	1,217
Engineering	1,738
Mathematics	600
Physics	619

**Price Increases**

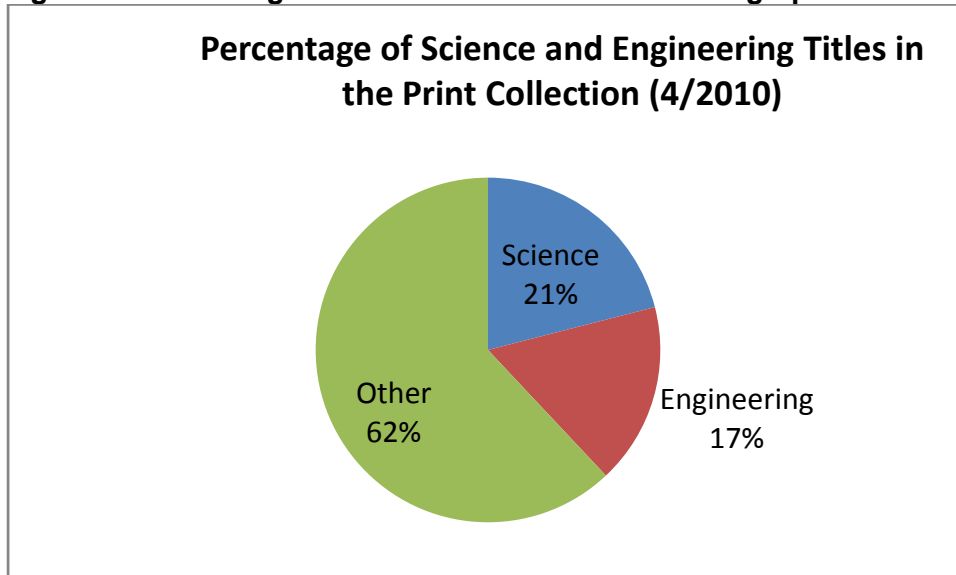
Like other academic libraries, DKL has experienced an average 9.7% annual price increase (or 35% increase over the last 4 years) in the unit price for science and technology journals alone (Figure 5). This inflation rate when coupled with similar increases in databases, software, and personnel costs makes it increasingly difficult for us to maintain current levels of subscription spending. In this environment of escalating costs we engage our stakeholders and monitor usage statistics to best leverage our limited resources to support the NPS mission.

**Figure 5. Average journal prices and inflation in NPS subject areas.**

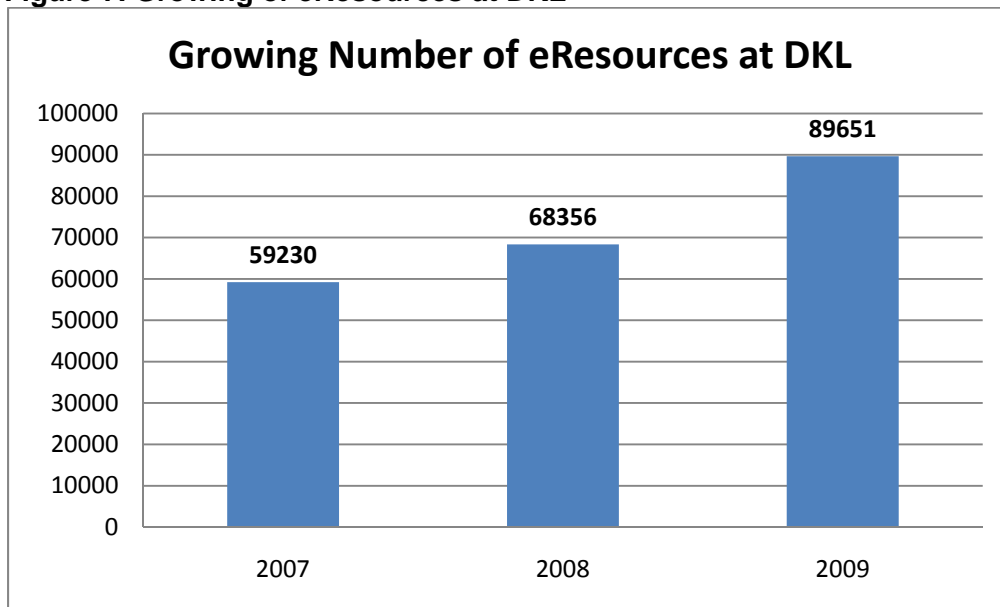


**Monographs (books, technical reports, and reference works):** Subject Specialist librarians work with faculty to continuously review and evaluate requirements and select/acquire books, proceedings, reference standards and other monographs to support NPS students, faculty, and staff. The current print collection is about 38% science/technology (Figure 6). While the library allocates fewer budget dollars to monographs than to databases and journals, we are significantly increasing full-text and e-book offerings in the sciences. The majority of our current ebooks are in science and technology areas. E-resources enable us to update editions and seamlessly integrate monographs into discovery and access tools for 24/7 access. This growing trend, especially for emerging and cutting edge subject areas, will refresh our science/technology print collection over time (Figure 7). The age of the DKL monograph collection further demonstrates the transition from print to online resources (Figure 8).

**Figure 6. Percentage of Science and Technical Monographs.**

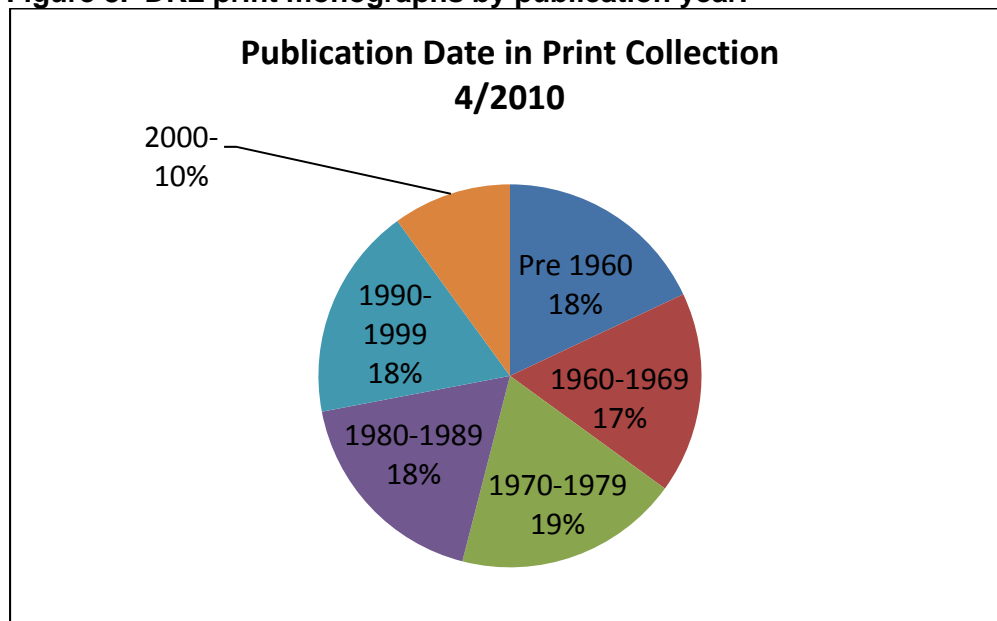


**Figure 7. Growing of eResources at DKL**





**Figure 8. DKL print monographs by publication year.**



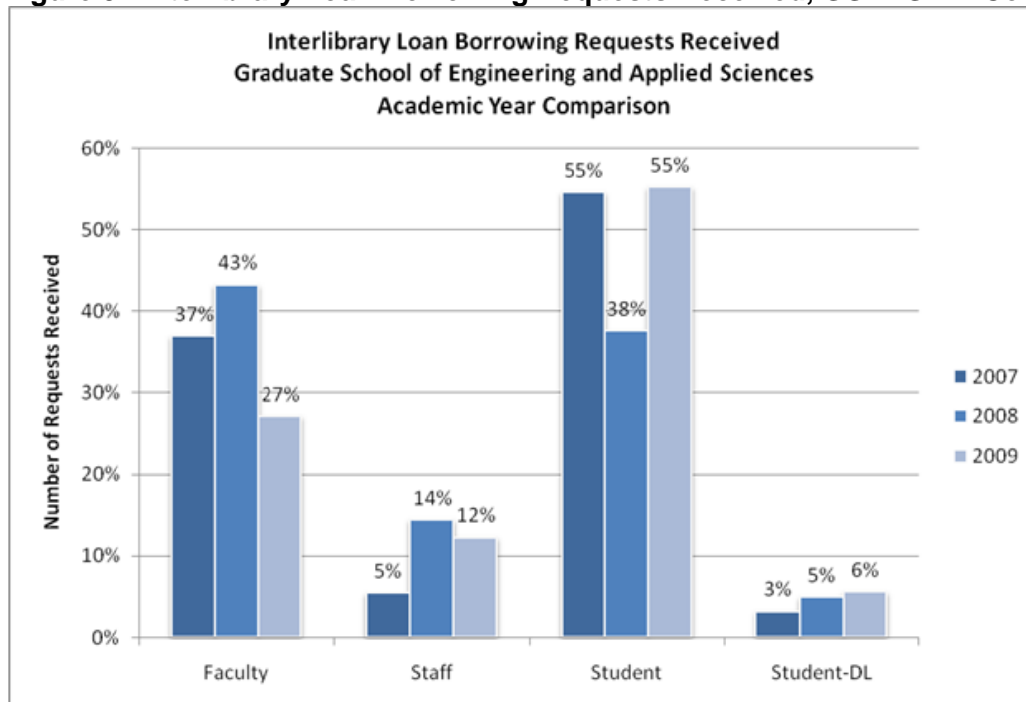
## Services

DKL provides a variety of public and behind-the-scenes services that support Applied Mathematics, including: circulation, interlibrary loan and document delivery from our collection; reference and instruction; acquisitions, cataloguing, collection maintenance; and systems support of our critical hardware/software systems and the DKL's robust website. Our services also promote better understanding and appropriate use of the Library's information resources by students and faculty.

**Circulation and Access to Library Materials:** DKL circulates materials to resident and distant members of the NPS community. Applied Mathematics use constitutes a small percentage of annual book circulation figures, in large part due to their heavy dependence on journals and online resources.

In cases where we do not have materials in our library, the DKL Interlibrary Loan team rapidly obtains articles and books from other libraries, delivering them electronically wherever possible. Applied Mathematics and other GSEAS faculty and students use this service in growing numbers (Figure 9).

**Figure 9. Interlibrary Loan Borrowing Requests Received, GSEAS AY Comparison.**



### Reference, Instruction and Outreach

All six librarians assist with general reference, but one is the designated Subject Specialist for Applied Mathematics. Research assistance is offered via in-person consultation, phone, email, real-time chat and even a by a popular text-messaging service. The subject specialist for Applied Mathematics provides services that include: library orientation and resource tours; reference; research assistance, and thesis preparation assistance (Table 3). He works with faculty and Program Officers to develop curriculum-focused and resource-specific library instruction that is delivered face-to-face in the Library or in the classroom. Utilizing a variety of web-based tools we are able to capture these sessions and provide help and other resources via our rich website. Librarians also work with faculty to provide customized information modules that are embedded in the campus learning management systems.

Science and technology students take advantage of the numerous drop-in classes the Library offers on various research tools and techniques. Classes include both database-specific instruction (e.g., *CSA*, *Defense Technical Information Center—STINET*, *INSPEC*, etc.) and skill-development specific classes (e.g., *Using RefWorks to Manage Citations*; *Library Research Quickstart*, *Searching the Web More Efficiently*, and *Thesis Quickstart*). In 2009 librarians taught 25 science/technology instructional classes to 409 students.

**Table 3. Reference, Instruction and Outreach (FY2009).**

<b>Reference/Instruction Statistics (FY 2009)</b>	<b>Total</b>
<b>Reference Questions Answered</b>	5,735
<b>Library Orientation Tours</b>	25
<b>Library Instruction</b>	
# classes taught	191
# students participating	2,990
# teaching hours	251
# Science & Technology specific classes	25
# Science & Technology students participating	409

The Library web site is a rich portal with resources, links, and training assistance targeted to specific curricular and subject audiences. Materials are presented in a variety of formats to account for the diverse learning styles of our adult-learner students. PDF handouts, PowerPoint presentations, Flash tutorials, and custom web pages provide important resources, instruction, and research assistance empower NPS students to discover, learn, and utilize Library resources at their point of need.

We also allow students to “take it with them when they go” by offering a small sampling of full-text resources and reference services to our alumni.

### **Summary**

The Dudley Knox Library provides a robust suite of content, systems, and services focused on supporting the instructional and research needs of NPS faculty, students, staff, and alumni. We repeatedly garner the highest praise in Student Exit and Alumni Surveys. Our goal is to prepare NPS students for future assignments as well as to cultivate their ability to utilize scholarly information resources as part of a lifelong learning strategy.

## **Appendix A. Selected Resources for Applied Mathematics.**

### **Aerospace & High Technology Database (CSA)**

The Aerospace Database provides bibliographic coverage of basic and applied research in aeronautics, astronautics, and space sciences. The database also covers technology development and applications in complementary and supporting fields such as chemistry, geosciences, physics, communications, and electronics. In addition to periodic literature, the database also includes coverage of reports issued by NASA, other U.S. government agencies, international institutions, universities, and private firms.

### **Computer and Information Systems Abstracts (CSA)**

There are thousands of sources in this growing field - and only Computer and Information Systems Abstracts provides fast, organized access to all of them, including hard-to-find conference literature. Jointly published with Engineering Information, this database provides a comprehensive monthly update on the latest theoretical research and practical applications around the world. From its inception as one of the earliest databases in the field, Computer and Information Systems Abstracts has proven itself an essential resource.

### **Defense Technical Information Center (DTIC)**

Through its Scientific and Technical Information Network (STINET) database, DTIC indexes, abstracts, and often provides the full text of defense-related government-sponsored scientific and technical reports. Public STINET contains approved for public release documents. Private STINET also contains limited and classified materials.

### **INFORMS PubsOnline**

Provides full-text access to the following INFORMS (Institute for Operations Research and the Management Sciences) publications: Decision Analysis, Information Systems Research, INFORMS Journal on Computing, Interfaces, Management Science, Manufacturing & Service Operations Management, Mathematics of Operations Research, Operations Research, and Organization Science.

### **JSTOR**

JSTOR is a digital archive collection of core scholarly journals in the humanities, social sciences and sciences. It contains the entire runs of each journal from the first volume up to those published 2 to 5 years ago. By agreement with the publishers JSTOR maintains a moving 2 to 5 year lag in most recent holdings available.

### **MathSciNet**

Provides citations and reviews from Mathematical Reviews (1940 to present) and current mathematical publications (1864 to present).

### **ProQuest Science Journals (ProQuest)**

Search full text and images for the leading periodicals in science and technology. Subject coverage includes computers, engineering, physics, telecommunications, and transportation.

### **Science Citation Index (ISI Web of Knowledge)**

The Science Citation Index® provides access to current and retrospective bibliographic information, author abstracts, and cited references found in over 5,900 of the world's leading scholarly science journals covering more than 150 disciplines. Dudley Knox Library's subscription covers articles and papers published from 1965-present.

**SIAM's Journals Online**

Contains the full text for SIAM Review, SIAM Journal on Applied Mathematics, SIAM Journal on Computing, SIAM Journal on Control and Optimization, SIAM Journal on Discrete Mathematics, SIAM Journal on Mathematical Analysis, SIAM Journal on Matrix Analysis and Applications, SIAM Journal on Numerical Analysis, SIAM Journal on Optimization, SIAM Journal on Scientific Computing from 1997 to present and all SIAM journals published from 1953 through 1996.

**Springer eBook Collection in Computer Science**

Covers areas such as Artificial Intelligence, Bioinformatics, Computer Communication Networks and Telecommunications, Image Processing, Computer Vision, Pattern Recognition, and Graphics, Information Systems and Applications, Internet/Web, and HCI, Programming and Software Engineering, Security and Cryptology, Theoretical Computer Science.

**Torpedo Ultra**

Provides access to full-text articles from a wide variety of journals published by Elsevier, Academic Press and Institute of Physics.

**Wiley Interscience**

Wiley Interscience is a full-text resource for scholarly journals and other electronic resources for research in Engineering, Mathematics and Statistics, Physics and Astronomy, Materials Science as well as Psychology and other Social Sciences areas including Business, Economics, Finance and Accounting. The Dudley Knox Library provides access to over 300 Wiley Interscience resources.