

Collection Policy: BIOMETRICS

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1.0 TEACHING, RESEARCH AND EXTENSION PROGRAMS

1.1 Mission and emphases of the department

The Biometrics Unit concentrates its activities in the following areas:

1. Basic research in statistics, biometry and biomathematics.
2. Applied, collaborative research in a wide variety of disciplines.
3. Teaching of service courses.
4. Teaching of courses for majors.
5. Statistical consulting for the Cornell community (mainly the statutory colleges).
6. Advising of graduate student minors and majors and undergraduate majors.

The Biometrics Unit is the premier biological (as opposed to biomedical) statistics program in the country.

1.2 Faculty research

Basic Research: The Unit prides itself on publishing in the best and most theoretical journals in our fields as well as conducting more applied research.

Specialties include: Nonparametric regression, models for DNA sequencing, mathematical modeling of epidemics, decision theory, confidence set estimation, empirical Bayes analysis, linear models, variance components estimation, multivariate statistics, nonlinear regression, ecological statistics, design of experiments, mathematical ecology, theoretical and computational biology, statistical genetics, computational statistics, parametric estimation and compartmental models.

Applied Research: Roughly half of the research conducted in the Unit is collaborative work with other researchers on campus. There are strong ties with the fields of Animal Breeding, Plant Breeding, Ecology and Systematics, Entomology, Nutrition, Natural Resources, Statistics, Applied Mathematics, Operations Research, the plant sciences, and Epidemiology (a graduate minor which crosses several fields).

1.3 Graduate program

There are about 20 graduate students, whose areas of concentration mirror the faculty's interests.

1.4 Undergraduate program

There are typically about 75 undergraduate majors. Cornell is one of the few universities in the country where a student can major in biometry and statistics at the undergraduate level. Students have a wide variety of interests in addition to biometry and statistics, including biology, business, mathematics, natural resources, and education.

1.5 Extension activity

The section has no extension duties, but it does operate a free statistical consulting service for the Cornell community. Each faculty member in the Unit and the teaching specialist consults two contact hours per week. Most clients are graduate students and faculty in the statutory colleges engaged in research. The services also assists staff and undergraduates from the statutory colleges, as well as clients from most other colleges on campus. Collaborative research projects often develop from the consulting service. Faculty, graduate students and undergraduate majors attend the consulting sessions for training purposes. A total of about 400 appointments per year are offered.

1.6 Noteworthy facilities (e.g. unique classrooms, laboratories, farms, etc.)

The Unit expects to establish its own computer laboratory for graduate research.

2.0 SUBJECT DESCRIPTION AND GUIDELINES

2.1 Subject definition

Biometry is the theory and application of statistics, mathematics, and computing to biological problems. (This is an updated version of the typical dictionary, e.g., Webster's, definition which states that biometry is the application of statistics to biological problems). Biometry got its start in the mid-17th century with the analysis of mortality tables in London. Sokal and Rohlf (Biometry, 2nd Edition, 1981) offer a brief history.

2.2 Subject scope

The research in the field of biometry goes hand in hand with research and developments in the biological sciences, making contributions to traditional areas such as agricultural field sciences; animal breeding; plant, animal, and human epidemiology; and ecology and evolutionary biology. Biometricians also make contributions to emerging trends in evolutionary biology, molecular genetics, and environmental sciences.

If biometry is divided by type of activity rather than the field of application, then one could make the broad categorizations of design of experiments, analysis of experiments, biomathematical modelling, and theoretical and computational biology. A complete scientific project would often involve aspects of all four.

Faculty interests include: categorical and binary data analysis, nonparametric regression, statistical methods for molecular genetics, statistical methods for population genetics, biomathematical modeling, growth curve analysis, decision theory, confidence set estimation, empirical Bayes analysis, linear models, variance components estimation, multivariate statistics, nonlinear regression, ecological statistics, and design of experiments.

Other areas which should be collected include:

- biomedical statistics (e.g., clinical trials, survival analysis, genetic algorithms)
- demographic methods (particularly for use in rural sociology)
- textbooks (not edited volumes) in statistical methods for human ecology and nutrition.

Exclusions:

- Books of problems or exercises.

2.3 Emerging trends in the subject area

Some major trends in biometry are:

1. The increased use of computer simulation and computation in biology and biometry.
2. The increased use of mathematical modeling in biological work.
3. The need for new biometrical techniques to address questions at the molecular level.
4. The need for sampling and statistical analysis techniques in environmental assessment and monitoring programs.

New developments in software for statistical genetics, statistical computing and theoretical and computational biology are advancing those fields.

3.0 SPECIAL INFORMATION NEEDS AND RESOURCES

3.1 Special information needs of those working in this subject area.

DNA sequence data; however, the faculty feel that there is no need for Mann Library to acquire and maintain a collection of DNA sequence data files because data of this kind are widely available on the Internet / World Wide Web.

3.2 Special collections or noteworthy resources in the field

MathSciNet on the Mathematics Library Home Page. This does not, however, include the indexes Current Index to Statistics, from the American Statistical Association, or Index to Statistics and Probability. If

possible, the Knight Ridder MathSci Online, which does contain these two indexes, should be retained.
BIOSIS

3.3 Endowment funds or special funding arrangements

- Mann Endowment--General biology
- Sarna--Genetics
- Powell--General biology
- Biomedical--Epidemiology

4.0 TYPES OF MATERIALS

4.1 Priorities for types of materials

See [Priorities Table](#).

Specifically, Chapman and Hall produce useful edited monographs. Dekker, CRC and Lewis are uneven in quality.

4.2 Format

4.3 Geographical guidelines

The major countries generating statistical/biometrical publications of interest are the U.S. and England. Minor publications come from Germany, France, Japan, India and Russia.

4.4 Language guidelines

Almost all the important publications are available in English.

4.5 Chronological guidelines

Current.

5.0 OTHER RELATED LIBRARY COLLECTIONS

The Unit uses the Math Library as heavily as it does Mann. Less frequently, the Engineering, Entomology, Veterinary and ILR Libraries are used. The Johnson School of Management Library is useful for sampling and survey work.

6.0 POLICY QUESTIONS, COLLECTION NEEDS, FUNDING PROBLEMS OR OPPORTUNITIES

There is a need for general statistics texts which are not specifically biologically-oriented. Specific texts will be recommended by section faculty. New editions of these texts should be purchased as they appear.

Textbooks for programming in the C+ language would also be useful.

7.0 PRINCIPAL LC CLASSES

QA273-299
QH323.5

8.0 RELATED COLLECTION POLICIES

- o Education--mathematics education

Priorities Table for Biometrics

Code	IMPORTANCE/INTENSITY CODES DEFINITIONS
NA	Not applicable to the discipline.
0	Ephemeral; of insufficient value to be provided by library.
1	Of short term interest, but with little or no enduring value; very selectively acquired; retained, uncataloged, for limited duration only, e.g. newsletters in newly emerging, poorly documented areas, and manuals or pamphlets for reserve reading.

2	Limited scholarly interest or utility; collected very selectively, but not of high priority.
3	Important for research and/or instruction; should be well represented, but collected selectively rather than intensively.
4	Very important for faculty and/or students; intensively collected, i.e. every effort is made to provide as deep coverage of this literature as possible.
5	Essential to work in the discipline; the most important type of material for research or instruction purposes. Ensuring the highest possible coverage should be the library's top priority in this discipline.

Code	SERIALS	Notes
5	Journals, scholarly	-
5	Journals, technical	-
--	Journals, other (describe)	-
3	Annual reviews, advances in...	-
2	Scientific and technical reports and research bulletins of major academies, learned societies, professional research and educational organizations and government agencies	-
2	Proceedings, of international congresses and symposia	-
2	Proceedings, national or local	-
4	Statistical series	-
0	Trade journals and periodicals	-
0	Popular periodicals, hobby	-

0	Popular periodicals, semi-technical	-
0	Popular periodicals, farm press	-
3	Newsletters/newspapers	-
0	Proceedings of legislative bodies	-
0	Student publications	-
0	Administrative publications of major academies, learned societies, professional, research and educational organizations and government agencies	-
0	Corporate annual reports	-
0	Yearbooks	-
3	Press releases	-
0	Lists	-
0	Working papers	-

Code	MONOGRAPHS	Notes
3	Major scholarly monographs	-
3	Professional and technical	-
3	Subject histories	-
4	Textbooks, upper division, graduate	-

Code	ELECTRONIC INFORMATION	Notes
0	Applications programs	-
3-4	Bibliographic databases	-
0	Bulletin boards	-

2	Biographies	-
3	Popular monographs	-
2	Technical reports	-
2	Government reports	-
2	Proceedings, international	-
2	Proceedings, other	-
1	Theses and dissertations (outside CU)	-
2	Festschrift	-
0	Patents	-
0	Corporate histories	-
0	How-to books & lab manuals	-
0	Pamphlets	-
--	Ephemera (describe)	-
0	Maps	-
2	Technical bulletins/handbooks/compendia	-

0	Fulltext files	-
4	Geographic information systems	environmental data
4	Numeric/statistical files	DNA sequence data, government statistical files
-	Other (describe, taking as much space a necessary)	-

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