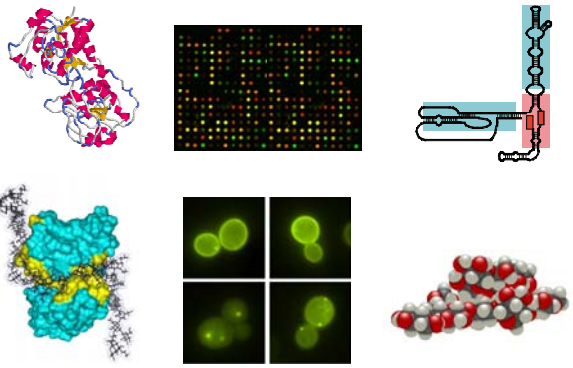
DEPARTMENT OF
Biochemistry & Molecular Biology
1785
THE UNIVERSITY OF GEORGIA



DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
B122 LIFE SCIENCES BUILDING
THE UNIVERSITY OF GEORGIA • ATHENS, GA 30602 USA
(706) 542-1334 • FAX: (706) 542-1738
http://www.bmb.uga.edu

Description of the Program

The department of Biochemistry & Molecular Biology (BCMB) is in the Franklin College of Arts and Sciences. The College offers both MS and PhD degrees in a variety of scientific disciplines, including Biochemistry and Molecular Biology.

Graduate students are usually admitted at the beginning of fall semester, but in special cases a student with previous experience may be admitted in January. **Deadline for all fellowships and assistantships is January 1**, but exceptional qualifications may lead to awards at other times.

In addition to the courses listed in the curriculum (see http://www.bmb.uga.edu), a number of interdisciplinary courses are available to interested students in the BCMB program. The listings in Biology, Botany, Cellular Biology, Genetics and Microbiology should be consulted to determine the range of courses available to graduate students majoring in Biochemistry and Molecular Biology; see http://www.gradsch.uga.edu for the online graduate bulletin.

For additional questions/concerns about the program, please contact the Biochemistry and Molecular Biology Graduate coordinator (Dr. Alan Przybyla; przybyla@bmb.uga.edu, 706-542-1728).

Degree Descriptions

MS

In general, the MS is completed in 2-4 years of full time attendance. The Graduate School specifies that all requirements for this degree be completed within six years, beginning with the first registration for graduate courses included on the final program of study.

Ph.D.

Students entering the doctoral program with a bachelor's degree usually require 4-6 years of full time work. Students entering the program with a Master's degree usually require 3-4 years of full time work. The Graduate School specifies that all requirements for this degree, except the dissertation and final oral defense, be completed within a period of six years dating from the time of first registration for graduate courses on the final program of study.

Departmental Research Areas

The Department of Biochemistry and Molecular Biology hosts a wide range of research that is funded by NIH, NSF, DOD, and various other federal and private funding agencies.

AGING AND DEVELOPMENT
- Cancer Biology
- Alzheimer's Disease
- Arthritis and Joint Diseases
- Cataracts
- Emphysema

BIOINFORMATICS
- Genomics and Proteomics
- Computational Biology

CELL BIOLOGY AND SIGNAL TRANSDUCTION
- Biosynthesis
- Cell Cycle
- Signal Transduction

COMPLEX CARBOHYDRATES / GLYCOBIOLOGY
- Animal Glycoconjugates
- Medical glycobiology
- Microbial and Plant Polysaccharides
- Structural Biology of Carbohydrates

ENZYMES AND MECHANISMS
- Glycosyl Transferases
- Metalloenzymes
- Thermophilic Enzymes

MEDICAL BIOCHEMISTRY
- Diabetes
- Endocrinology
- Genetic Diseases / Gene Therapy
- Human Diseases - Cystic Fibrosis, HIV, Porphyria
- Bacterial Infection

PHYSICAL BIOCHEMISTRY
- Bioluminescence / Fluorescence
- Biophysical Methods

PLANT BIOCHEMISTRY
- Cell Walls
- Development
- Metabolism

RNA: STRUCTURE / METABOLISM / CATALYSIS
- Ribozymes
- RNA Processing / Trafficking
- Transcription

STRUCTURAL BIOLOGY
- Crystallography
- Mass Spectrometry
- Molecular Modeling
- NMR

THERMOPHILIC ORGANISMS
- Metabolism and Bioenergetics

Inter-Departmental Research Areas

The faculty of Biochemistry and Molecular Biology are engaged in various inter-departmental efforts, including:

THE BIOMEDICAL HEALTH SCIENCES INSTITUTE (BHSI) facilitates and promotes interdisciplinary research and instructional efforts at UGA in the fields of biomedical and health sciences with the goal of improving the understanding of human health and disease.

THE CENTER FOR BIOLOGICAL RESOURCES RECOVERY conducts basic research in areas related to the use of microorganisms in biotechnology and in solving environmental and ecological problems.

THE NORTHEAST GEORGIA CANCER CENTER (NEGCC) is a multidisciplinary research center integrating campus, community, and state resources for the basic research, education, prevention, and treatment of cancer.

THE CENTER FOR METALLOENZYME STUDIES (CMS) consists of numerous University of Georgia faculty from various disciplines and departments, all of whom have research interests in the study of metals in biology.

THE COMPLEX CARBOHYDRATE RESEARCH CENTER (CCRC) conducts basic research to study the structure and function of complex carbohydrates, and trains scientists from the U.S. and around the world in the principles, methods, and analytical techniques used to study complex carbohydrates.

THE COMPUTATIONAL CENTER FOR MOLECULAR STRUCTURE AND DESIGN (CCMSD) focuses on understanding molecular structures and interactions, as well as developing new computational procedures (primarily in the area of molecular mechanics and molecular modeling methods).

THE GEORGIA X-RAY CRYSTALLOGRAPHY CENTER aims to develop new approaches and techniques in X-ray crystallography for an improved understanding of how structure relates to function in biological macromolecules.

THE PLANT CENTER is focused on the cellular and molecular aspects of plant growth and development, plant genome organization and function, the application of molecular and genetic tools to improve cultivated plants, and in understanding organisms that interact with plants.

THE SOUTHEAST COLLABORATORY FOR STRUCTURAL GENOMICS (SECSG) is one of seven original pilot centers for structural genomics established by the NIH. It aims to develop, integrate, and test all of the constituents for carrying out cost-effective and high throughput structural genomics research.

THE SOUTHEAST COLLABORATORY FOR HIGH-FIELD BIOMOLECULAR NMR is an inter-institutional resource dedicated to the development and application of new NMR methods for biomolecular studies. It provides 900 MHz NMR access in addition to existing 800 MHz access.

Facilities

The Department is housed, along with the Department of Genetics, in the Life Sciences building, a state-of-the-art laboratory complex. In addition to 80 modern research laboratories, the building contains teaching laboratories, administrative areas, lecture rooms, a scientific library, extensive animal quarters, a fermentation facility, and a fiber optic network.

The building also houses the Molecular Genetics Instrumentation Facilities, a support facility that provides various laboratory services, including DNA and peptide sequencing and synthesis, chromatography, mass spectrometry, automated proteomics services (high-throughput two-dimensional gel electrophoresis, multi-dimensional chromatography), and automated genomics services (microarray printing, single-nucleotide polymorphism analysis). Additional support facilities available at the University include a modern microscopy facility, a monoclonal antibody facility, a computer center, a glassblowing shop, a machine shop, and greenhouses.

The Department is conveniently located close to the University's Science Library which houses approximately 850,000 volumes of the total University holding of more than 2.7 million volumes (ranked 26th among all U.S. research libraries). The library subscribes to a wide range of scientific journals, and many of these can be accessed electronically.

Location and Quality of Life

The University of Georgia is located in historic Athens, a town of about 100,000 permanent residents. Athens is approximately an hour's drive east of Atlanta, a two-hour drive from the north Georgia mountains and the Appalachian trail, and a five-hour drive from the Atlantic and Gulf coasts. Numerous outdoor activities can be found in and around the Athens area.

The multi-cultural flavor of Athens is reflected by the wide range of restaurants that serve the community - Caribbean, Chinese, Greek, Italian, Jamaican, Japanese, Mexican, and Thai - and the many festivals, events, and outdoor concerts that are hosted by the city, often in conjunction with the University. The Athens' music scene is vibrant, having been the birthplace of internationally known music groups - B-52's and REM. The University also draws nationally renowned exhibits, performances, and concerts through the School of Music, the University Theater, and the Georgia Museum of Art.

The athletic facilities at the University of Georgia are among the nation's best. These facilities support several nationally ranked collegiate sports teams, have been used as Olympic venues, and are generally open to students for recreational use.

Application and Admission

General Requirements

Requirements for admission to graduate study in Biochemistry and Molecular Biology (BCMB) include a bachelor's degree from an accredited institution and the equivalent of an undergraduate major in Biochemistry, Chemistry, or another biological science. Students with majors in other areas are strongly encouraged to apply, with the understanding that deficiencies will be eliminated in the first year of residence.

How to Apply

Apply online at http://www.gradsch.uga.edu or contact one of the following:

- the BCMB Graduate Coordinator (Dr. Alan Przybyla przybyla@bmb.uga.edu)
- the Department of Biochemistry and Molecular Biology
- the University of Georgia Graduate School

You must submit:

- Official transcripts of all colleges and universities attended.
- Official Graduate Record Examination scores. Only the verbal and quantitative portions are required; arrangements for the GRE may be made through the Educational Testing Service, Box 555, Princeton, NJ 08540.
- TOEFL and TSE scores for foreign applicants.
- Three letters of recommendation by persons familiar with your academic credentials, training, and research potential.

When to Apply

The majority of graduate students enter the program in the fall semester (August) of each year, as the core curriculum is offered chronologically beginning in the fall. Some exceptions are made for those with a strong biochemistry background or an MS degree from ar accredited institution. The application deadline for financial support is January 1st, but occasionally, funding can be arranged at a later date for excellent candidates.

Admission

The Graduate Affairs Committee determines admission to the BCMB Graduate Program. Admission guidelines are fairly flexible. In genera it is expected that prospective students have a minimum GPA of 3.0, combined verbal and quantitative GRE score of 1200, and excellent letters of recommendation. Foreign applicants must have competitive TOEFL and TSE scores. Other considerations such as laboratory experience, publication record, prior degrees, etc., may negate deficiencies in the three primary areas.

Financial Support

The Department of Biochemistry and Molecular Biology makes every effort to provide financial support to graduate students that are enrolled full time in the M.S. or Ph.D. programs. Primary sources of support include university fellowships, and research and teaching assistantships. Students are also encouraged to obtain extramural fellowship support.

All applicants are considered for of the financial support possibilities described below:

Presidential Graduate Fellowships are aimed at exceptionally qualified students. This highly competitive award guarantees 5 years of support with a competitive annual stipend and a tuition waiver. Only citizens and legal permanent residents are eligible.

Graduate School Assistantships provide two years of support and are intended to allow students to develop their own research programs. After two years, students are typically supported by departmental research assistantships. One-third time service is required, and out-of-state fees are waived. Students are expected to provide 15 hours a service to the department each week in a way to be determined by the student, graduate coordinator, and chairman.

Departmental Research Assistantships are usually one-third time research positions that are supported by grants to individual faculty in this and other departments. Out-of-state fees are waived for research assistants who perform at least one-third time service. Applications for research assistantships are made directly to individual faculty members (invariably the prospective major professor).

Departmental Teaching Assistantships are awarded on a competitive basis by the Department. These assistantships carry a stipend for a twelve-month appointment. Out-of-state fees are waived for teaching assistants who perform at least one-third time service.

Generally, students in the Biochemistry and Molecular Biology graduate program are provided with annual stipends that are in line with the guidelines set forth by the National Institutes of Health and other federal funding agencies. The Southeast region enjoys a low cost of living, making these stipends of greater economic value than those offered elsewhere.

Faculty

Adams, Michael W. W.
E-mail: adams@bmb.uga.edu
Office: B216B Life Sciences, Phone: 542-2060
Lab: B218 / A228 Life Sciences, Lab Phone: 542-1909 / 542-3023
Research: Genomics, metabolism and enzymology of hyperthermophiles, organisms that grow near 100°C.

Adang, Michael J.
E-mail: adang@arches.uga.edu
Office: 427 Biological Sciences, Phone: 542-2436
Lab: 427 / 432 Biological Sciences, Lab Phone: 542-2255
Research: Characterization of *Bacillus thuringiensis* toxins and receptors in insect midgut membranes.

Albersheim, Peter
E-mail: palbersh@ccrc.uga.edu
Office: 2013 CCRC, Phone: 542-4404
Research: Structures and functions of biologically active plant cell wall oligo- and polysaccharides.

Black, Clanton C.
E-mail: ccblack@bmb.uga.edu
Office: A314A Life Sciences, Phone: 542-1778
Lab: A310 Life Sciences, Lab Phone: 542-1780
Research: Understanding the C4 pathway of photosynthesis, the daily regulation of Crassulacean acid metabolism, and sucrose metabolism in plants.

Brewer, John M.
E-mail: brewer@bmb.uga.edu
Office: A314B Life Sciences, Phone: 542-1773
Lab: A316 Life Sciences, Lab Phone: 542-1776
Research: Relation between enolase subunit association and activity.

Carlson, Russell W.
E-mail: rcarlson@ccrc.uga.edu
Office: 2043 CCRC, Phone: 542-4439
Lab: 2034 CCRC, Lab Phone: 542-4418
Research: The structures and roles of bacterial glycoconjugates in microbe-plant and -animal interactions.

Dailey, Harry A.
E-mail: hdailey@arches.uga.edu
Office: A220B Life Sciences, Phone: 542-2690
Lab: A222 Life Sciences, Lab Phone: 542-7252
Research: Studies on the regulation of heme synthesis and structure / function of heme pathway enzymes.

Darvill, Alan
E-mail: adarvill@ccrc.uga.edu
Office: 2020 CCRC, Phone: 542-4411
Research: Structures and functions of the noncellulosic polysaccharides of plant primary cell walls.

DerVartanian, Daniel V.
E-mail: dervar@bmb.uga.edu
Office: A220A Life Sciences, Phone: 542-4620
Lab: A218 Life Sciences / Biol. Science., Lab Phone: 542-1779 and 542-1693
Research: Study of nickel-containing proteins or enzymes from heart tissue as marker for heart attacks.

Glover, Claiborne V. C.
E-mail: glover@arches.uga.edu
Office: A414A Life Sciences, Phone: 542-1769
Lab: A410 Life Sciences, Lab Phone: 542-1768
Research: Protein phosphorylation in budding yeast.

Lanzilotta, William N.
E-mail: wlanzilo@bmb.uga.edu
Office: A128B Life Sciences, Phone: 542-1324
Lab: A130 Life Sciences, Lab Phone: 542-1573
Research: Crystallographic investigation of nutrient sensing, transport, and metabolism by enteric pathogens.

Lee, John W.
E-mail: jlee@arches.uga.edu
Office: A120A Life Sciences, Phone: 542-1764
Lab: A116 Life Sciences / A126 Life Sciences, Lab Phone: 542-1764
Research: Mechanism and structure of bioluminescence proteins.

Ljungdahl, Lars G.
E-mail: larsljd@arches.uga.edu
Office: A214 Life Sciences, Phone: 542-1846
Lab: A210 / A216 Life Sciences, Lab Phone: 542-1086
Research: Autotrophic fixation of CO2 and hydrolysis of plant polysaccharides by anaerobic bacteria and fungi.

Mendicino, Joseph F.
E-mail: mendicin@bmb.uga.edu
Office: B210A Life Sciences, Phone: 542-3010
Lab: B212 Life Sciences, Lab Phone: 542-3010
Research: Role of glycosyltransfereases and sulfotransferases in the pathology of Cystic Fibrosis.

Mohnen, Debra
E-mail: dmohnen@ccrc.uga.edu
Office: 2044 CCRC, Phone: 542-4458
Lab: 2047 CCRC, Lab Phone: 542-4499
Research: Biosynthesis and function of the plant cell wall polysaccharide pectin and the effects of pectin on human health.

Moremen, Kelley W.
E-mail: moremen@arches.uga.edu
Office: 3055 CCRC, Phone: 542-1705
Lab: 3050/ 3053 CCRC, Lab Phone: 542-1706
Research: Structure, function, mechanism of action, and regulation of enzymes in mammalian glycoprotein biosynthesis and catabolism.

Orlando, Ron
E-mail: orlando@ccrc.uga.edu
Office: 1078 CCRC, Phone: 542-4429
Lab: 1080 CCRC, Lab Phone: 542-4414
Research: Solving biological / biomedical problems with mass spectrometry.

Pierce, J. Michael
E-mail: hawkeye@arches.uga.edu
Office: 3056 CCRC, Phone: 542-1702
Lab: 3059 / 3060 CCRC, Lab Phone: 542-1701
Research: Glycosyltransferase regulation of tumor cell adhesion and invasion; structure / function of lectins.

Prestegard, James H.
E-mail: jpresteg@ccrc.uga.edu
Office: 1077 CCRC, Phone: 542-6281
Lab: 1045 / 1075 CCRC, Phone: 542-0257 / 542-6286
Research: Application of nuclear magnetic resonance spectroscopy to the characterization of biologically important systems.

Przybyla, Alan E.
E-mail: przybyla@bmb.uga.edu
Office: A420B Life Sciences, Phone: 542-1728
Lab: A422 Life Sciences, Lab Phone: 542-1720
Research: Our laboratory employs recombinant technology to investigate the role of beta amyloid peptide fibrilization in the onset of Alzheimer's disease.

Puett, J. David
E-mail: puett@bmb.uga.edu
Office: B129 Life Sciences, Phone: 542-1676
Lab: B302A / B322 Life Sciences, Lab Phone: 542-1724 / 542-1718
Research: Molecular & cellular biochemical endocrinology emphasizing G protein-coupled receptors & tumor biology.

Schmidt, Walter K.
E-mail: wschmidt@bmb.uga.edu
Office: A408A Life Sciences, Phone: 583-8241
Lab: A410 Life Sciences, Lab Phone: 583-8242
Research: Molecular and biochemical analyses of eukaryotic proteases required for the maturation of prenylated signaling molecules.

Terns, Michael P.
E-mail: mterns@bmb.uga.edu
Office: A326B Life Sciences, Phone: 542-1896
Lab: A328 Life Sciences, Lab Phone: 542-3520
Research: Biogenesis, transport, and function of cellular RNAs and RNA-based gene therapy agents.

Tiemeyer, Michael
E-mail: mtiemeyer@ccrc.uga.edu
Office: 3019 CCRC, Phone: 542-2740
Lab: 3024 CCRC, Lab Phone: 542-9740
Research: Structure and function of cell surface carbohydrates in the developing nervous system, genetic control of glycan expression.

Urbauer, Jeff
E-mail: urbauer@chem.uga.edu
Office: A308 Life Sciences, Phone: 542-7922
Lab: A310 Life Sciences, Lab Phone: 542-7923
Research: Protein structure and function, NMR spectroscopy of proteins, prokaryotic transcription, oxidative stress and calmodulin

Wang, B. C.
E-mail: wang@bcl1.bmb.uga.edu
Office: B204A Life Sciences, Phone: 542-1747
Lab: B202 / B206 Life Sciences, Lab Phone: 542-3384 / 542-3403
Research: Structure-function studies by X-ray diffraction, transcription proteins, structural genomics, phasing methods.

Wells, Lance.
E-mail: lwells@ccrc.uga.edu
Office: 3018 CCRC, Phone: 542-7806
Lab: 3012 CCRC, Lab Phone: 542-9741
Research: Elucidating mechanisms of nutrient sensing in Type II diabetes and cancer mediated by post-translational modification of proteins

Woods, Robert J.
E-mail: rwoods@ccrc.uga.edu
Office: 1089 CCRC, Phone: 542-4454
Lab: 1092 / 2069, Lab Phone: 542-0263/542-3508
Research: Immunological carbohydrate-protein interactions studied by computational simulation and experimental methods.

Xu, Ying
E-mail: xyn@bmb.uga.edu
Office: A108A Life Sciences, Phone: 542-9779
Lab: A110 / A134 Life Sciences, Lab Phone: 542-9779
Research: Computational molecular biology, bioinformatics focusing on protein structure prediction, biological pathway modeling, and biological data mining.

York, William S.
E-mail: will@ccrc.uga.edu
Office: 2081 CCRC, Phone: 542-4628
Lab: 2083 CCRC, Lab Phone: 542-4419
Research: Molecular dynamics and topology of polysaccharide networks in the cell walls of higher plants.

Research Faculty Holding Graduate Faculty Appointments

Narayan, Prema
E-mail: narayan@bmb.uga.edu
Office: B320B Life Sciences, Phone: 542-1721
Lab: B322 Life Sciences, Lab Phone: 542-1718
Research: Transgenic mouse models for constitutively active luteinizing hormone receptors.

Rose, John
E-mail: rose@bcl4.bmb.uga.edu
Office: B204B Life Sciences, Phone: 542-1750
Lab: B206 Life Sciences, Lab Phone: 542-3403
Research: X-ray crystallography as applied to structural biology and structural genomics.

Terns, Rebecca
E-mail: rterns@bmb.uga.edu
Office: A326 Life Sciences, Phone: 542-1703
Lab: A328 Life Sciences, Lab Phone: 542-3520
Research: Assembly / transport of RNA-protein complexes implicated in cancer and neuromuscular disease; analysis of related complexes in hyperthermophilic archaea.

Distinguished Ph.D. Graduates of the Department

James N. Ihle, Ph.D. (1971). *Thesis:* Regulation of enzyme synthesis during embryogenesis and germination of cotton. *Current Position:* Professor and Chair – Biochemistry Dept., St Jude Children's Research Hospital, Memphis, TN.

D. Mack Ivey, Ph.D. (1987). *Thesis:* Generation of energy during CO2 fixation in acetogenic bacteria.
Current Position: Assoc. Professor, Dept. of Biological Sciences, University of Arkansas, Fayetteville, AR.

Richard McCann, Ph.D. (1995). *Thesis:* Identification and characterization of CKM1 and CDC37 as physiological partners of *Saccharomyces cerevisiae* casein kinase II. *Current Position:* Assistant Professor, Dept. of Biochemistry, University of Kentucky, Lexington, KY.

William C. Merrick, Ph. D. (1971). *Thesis:* Changes in isoaccepting tRNA species during germination of cotton seeds. *Current Position:* Professor, Dept. of Biochemistry, School of Medicine, Case Western Reserve University, Cleveland, OH.

Michael R. Moore, Ph.D. (1975). *Thesis:* Isolation and kinetic properties of methylene-tetrahydrofolate dehydrogenase from *Clostridium formicoaceticum. Current Position:* Professor, Dept. of Biochemistry and Molecular Biology, Marshall University, School of Medicine, Huntington, WV.

William E. O'Brien, Ph.D. (1971). *Thesis:* The synthesis of acetate from carbon dioxide by *Clostridium formicoaceticum. Current Position:* Professor, Dept. of Molecular and Human Genetics, Baylor College of Medicine, Houston, TX.

Ramesh Padmanabha, Ph.D. (1989). *Thesis:* A biochemical and genetic analysis of yeast casein kinase II. *Current Position:* Senior Research Scientist, Bristol Myers-Squibb, Wallingford, CT.

Stephen W. Ragsdale, Ph.D. (1983). *Thesis:* Electron transfer reactions involved in acetogenic bacteria. *Current Position:* Professor, Dept. of Biochemistry, University of Nebraska, Lincoln, NE.

Craig Reed, Ph.D. (1995). *Thesis:* Biochemical and molecular genetic analysis of casein kinase II regulatory subunit function. *Current Position:* Project Manager, Chemical and Biological Defense Division, Southern Research Institute, Frederick, MD.

Christopher F. Reilly, Ph.D. (1982). *Thesis:* The structural and functional characteristics of human leukocyte cathepsin G. *Current Position:* Vice President, AstraZeneca, Macclesfield, England.

Sangram Sisodia, Ph.D. (1985). *Thesis:* Structural and functional comparison of nucleic acid helix destabilizing protein and lactate dehydrogenase 5 of rat. *Current Position:* Thomas Reynolds Sr. Family Professor of Neurosciences and Director - The Center for Molecular Neurobiology, The University of Chicago, Chicago, IL.

William S. York, Ph.D. (1996). *Thesis:* Development and application of spectroscopic methods for the structural analysis of xyloglucans and xyloglucan oligosaccharides. *Current Position:* Assistant Professor, Dept. of Biochemistry and Molecular Biology, University of Georgia, Athens, GA.

If you have a disability and need assistance in order to obtain this brochure in an alternative format, please contact the Department of Biochemistry and Molecular Biology at (706) 542-1334.

November 2003

Cover Photos

Top:
Life Sciences Building, University of Georgia.

Middle (top, left to right):
Ribbon diagram of GnT-V (J. Prestegard).
P. furiosus microarray data (M. Adams).
Telomerase RNA diagram (M. Terns).

Middle (bottom, left to right):
Surface antigen from group B streptococcus (R. Woods).
Ras2p localization in various yeast backgrounds (W. Schmidt).
A small section of a plant xyloglucan (W. York).

Bottom:
Various images of the University of Georgia.