# 2015 Governor's School For Scientific Models and Data Analysis

East Tennessee State University, Johnson City, Tennessee

# Student Handbook

**Sunday, May 24th – Friday, June 26th, 2015**

*Funded by the Tennessee State Department of Education with additional support from East Tennessee State University*

East Tennessee State University, Johnson City, does not discriminate on the basis of race, color, religion, national origin, age, disability, or veteran status in provision of educational opportunities or employment opportunities and benefits. This policy extends to both employment by and admission to the University.

The University does not discriminate on the basis of race, sex, or disability in its education programs and activities pursuant to the requirement of Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disability Act (ADA) of 1990.

Inquiries and charges of violation concerning Title VI, Title IX, Section 504, ADA or the Age Discrimination in Employment Act (ADEA) or any of the other above referenced policies should be directed to the Office of Equity and Diversity (OED), ETSU, Box #70734, Johnson City, TN 37614-1709, telephone (423) 439-4445. Requests for accommodations of a disability should be directed to the ADA Coordinator at the ETSU Office of Human Resources, Burgin Dossett #307, Johnson City, TN 37614-1709

***Dr. Anant Godbole***
Director

***Ms. Angela Haga***
Assistant Director

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# Governor's School for Scientific Models and Data Analysis

The overarching goal of the ***Governor's School in Scientific Models and Data Analysis*** is to broaden the students' appreciation and knowledge of biology and mathematics through exposure to and integration of a wide range of contemporary biological and mathematical topics. In each case, model building and data analysis will play a critical role and will be interwoven in a statistical and biological context. Students will be engaged in the scientific method via hands-on research experiences. Resources from E.T.S.U.'s strong undergraduate science and mathematics program, research laboratories, and local schools will be used to accomplish these objectives. In addition, the program will make use of resources from industry, governmental agencies, and academic science establishments. Thus, the school will provide a series of courses, laboratories, projects, field trips, seminars, lectures, and other activities centered on mathematics, statistics, and biology. Some of the field trips will include ***Aerojet/Rocketdyne; Snap-On Tools; Gray Fossil Site and Museum; Bays Mountain Nature Center; Eastman Chemical Company; ETSU Medical School Laboratory Tour; Roan Mountain State Park Nature Tour and Nature Walk; Historic Jonesborough (the oldest town in Tennessee) "Live Music on the Square" and shopping in quaint local shops and The Carter Family Fold Museum and concert arena***. The curriculum will consist of courses BIOL-1110-1111 (4 credits, biological sciences for majors) and MATH 1530 (3 credits, probability and statistics), which will be taught in the integrated fashion developed through a $1.7 million grant from Howard Hughes Medical Institute, e.g., cells, ecology, metabolism, enzymes, evolution, and genetics. Students will experience a renaissance style school that provides them a healthy respect for many disciplines and career options as they get ready to enter college.

## The Curriculum

*The curriculum offered will include two regularly-offered courses (seven hours total):*

**BIOL 1110-012** ***Biology for Science Majors Lecture I*** (3 hrs.) -- ***Course Request Number***
Core requisite: BIOL 1111. Principles of molecular and cellular biology, including metabolism and genetic inheritance. Designed for biology majors, minors, and others who plan to take upper-level courses for which this is a pre requisite. Three (3) hours of lecture and two hours of lab. A common grade will be given in BIOL 1110/11.

**BIOL 1111-012** ***Biology for Science Majors Lab I*** (1 hr.)-- ***Course Request Number***
Core requisite(s): BIOL 1110. Laboratory exercises to gain the ability to identify and use the processes of biological science with materials corresponding to Biology for Science Majors Lecture I. One (2) two-hour lab per week. A common grade will be given in BIOL 1110/11.

**Math 1530-014** ***Probability and Statistics*** (3 hrs.) -- ***Course Request Number***
Prerequisite (s): Two years of high school algebra. Descriptive statistics and its relevance, including probability, experimentation, measurement, sampling and survey, informal statistical inference, and hypothesis testing are included.

## Important Dates: The following are important dates for parents and students:

**Sunday, May 24th, 2015**
**10:00 – 12:30** Student check-in- **Luntsford Apartments**
**12:30 – 2:00** Luncheon & Informational Session for students and parents- **Room 315 (Warf-Pickel Hall)**

**Friday, June 26th, 2015**
**12:00 – 1:30** Luncheon & Closing Ceremony (Attending: students, parents, counselors, professors, director, assistant director and, guest speakers) **Millennium Center-- Ballroom 237-A**
**1:30 – 3:00** Students will check out of dormitory and head home

## Directions to the Residence Hall: **(Luntsford Apartments)**

Driving Directions to East Tennessee State University (You may use http://www.mapquest.com and plan out the route from your home (physical 911 address to 700 University Parkway [ETSU]. MAPQUEST will give you detailed information and also a map-origination and destination. **Johnson City, Tennessee**

- **Coming from the north, south and west use I-81.**
- **Exit onto I-26 toward Johnson City/Asheville.**
- **Take exit 31 onto University Parkway and follow the signs to campus.**
- **Coming from the east, take I-26 from Asheville, N.C., then Exit 31 onto University Parkway. Follow the signs to campus.**

## Residence Hall Information

Originally opened in 1971 and completely renovated in the Fall of 2007, Luntsford Apartments is a five story structure housing 181 female residents in double occupancy efficiency apartments. Apartments include combined sleeping & living space with a kitchenette and private bath.
http://www.etsu.edu/students/housing/prospectivestudents/viewhalls/luntsford.aspx

You will receive a ***Card dorm key***, which must be turned in at checkout, so be careful with the key to your room. The University has a **standard $30.00 charge for lost keys** and cannot be responsible for the loss or damage of students' possessions. Residence halls, like hotels, are places for occasional loss of property that is almost never relocated or recovered. Students should remember to lock their doors each time they leave their rooms in order to protect their belongings and those of their roommates.

## Identification

**YOU WILL NEED TO BRING WITH YOU AN OFFICIAL PICTURE ID** When you check in; you will also receive a ***Governor's School*** name badge and a Special Functions Identification Card. ***When on campus, you are required to wear your badge at all times.*** The special ID authorizes your presence on campus. Please carry this ID with you at all times – there is a $30.00 charge to replace lost ID. **This ID will be required for meals, to check out books from the library, to gain access to swimming and other athletic facilities, and to be admitted to certain cultural events.**

## Visitation Policy:

Because we have a full, seven day-a-week schedule of instructional and recreational activities planned for the Governor's School students, we must ask that parents and friends abide by a ***"vistors" policy***. Parents, friends and other unauthorized visitors will not be permitted in classes, in the residence hall at any time, or on any field trips or other activities of the Governor's School.

## Contacting Student in case of an Emergency:

In any emergency situation or regarding information about the location of each student, the assistant director Angela Haga can be contacted at (423) 439-7592 from 8:00am to 4:30pm, Monday through Friday. At other times the student can be contacted by calling the lead counselor (phone number will be forthcoming when students check in to Luntsford Apartments).

## Automobile Policy:

Students **WILL NOT BE PERMITTED** to use a car while enrolled in the ***Governor's School for Scientific Models and Data Analysis***. **NO CARS WILL BE ALLOWED ON CAMPUS AT ANY TIME FOR ANY REASON!** There will be no need for an automobile because all activities on campus are within walking distance of the dormitory, and the Governor's School provides transportation for off-site field trips and recreational activities.

**Telephones:** Each dormitory room has voice/internet protocol phone. However, no long distances phone calls can be made on these phones, but students may make long distance calls on a collect basis, or through use of a long-distance telephone calling card. On-campus numbers (439-numbers) are accessed by dialing 9 and the last four digits. To make local calls to off campus phones, first dial 8, wait for a dial tone, and then dial the number. For room to room, dial 3 then the four digit number for that room. For operator assisted long distance calls, dial 8, wait for a dial tone, dial 0 + area code + number; the operator will answer. Students cannot accept collect calls. As a courtesy to their roommates, students should limit phone calls to fifteen minutes and not receive or make calls after midnight.

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**Cell Phones:** Students participating in the ***Governor's School for Scientific Models and Data Analysis*** MAY BRING CELL PHONES: For use during free time and on Family Day ***ONLY***. Cell phones are prohibited in class, during class related activities such as field trips and other related Governor's School activities, or walking to and from class, from the dormitory to the D.P. Culp Center, etc.

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**Mail:** The campus post office, located on the lower level of the Culp University Center, is a full service federal contract station with more than 13,500 P.O. boxes and offering retail service comparable to any United States Post Office. Business operating hours are 8:20 a.m. to 3:50 p.m. Monday through Friday. No service is provided on the weekends, but P.O. Box access is available 7 days a week, 8:00 a.m. until 10:00 p.m. through the post office lobby.

For more information call (423)439-4232. Students may purchase stamps at the *East Tennessee State University Post Office*.

**All student mail will be delivered to Ms. Angela Haga and then disbursed by the GS counselors to each student who receives mail.** Students may receive mail at:

***Name of student***
*East Tennessee State University*
*C/o Governor's School for Scientific Models and Data Analysis*
*P.O. Box 70301*
*Johnson City, TN 37614-1709*

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**Expenses and Money:** The Tennessee Governor's School pays for most student expenses, including tuition, dormitory room costs, food, recreation fees and transportation on field trips. Most students will need a modest amount of spending money. Money should also be available for prescription(s) and over-the-counter medications needed. Transportation will be provided to pharmacy if needed.


Students ***will not*** be able to cash money orders or personal checks and will have even greater difficulty cashing out-of-town checks from parents. ***The Governor's School and/or East Tennessee State University*** will not be able to intervene in money transfers.

***Traveler's Checks are the safest and easiest way to bring money to the School.*** They can be cashed at the D.P. Culp University Center. Bank cashier's checks may also be cashed at the D.P. Culp University Center. The limit for check cashing is $50 per visit. There is also an automatic teller machine available in the D.P. Culp Center.

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**Clothing:** In the months of June through July, the high temperatures will be in the 80's and 90's. We recommend that you dress casually, comfortably and discreetly for daily activities. In classes or other academic settings, walking shorts are acceptable; NO short shorts, halter tops or provocative apparel should be worn. Most buildings are air-conditioned, so, you may want to bring a sweater or sweatshirt.

Depending on recreational activities planned, jeans or other long pants, long sleeve shirt and a sturdy pair of footwear will be needed. An ***umbrella or poncho*** would be a good idea. Please bring a daypack or backpack to carry your books and personal belongings on field trips and to and from classes. For our opening and closing events, more formal attire is suggested such as church clothes.

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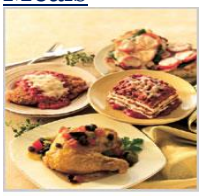
**Laundry:** Laundry facilities are located in the dorm and the cost for washer and dryer is $1.75 per load each. Students are expected to pay their laundry expenses. We suggest you bring a supply of laundry detergent, fabric softener, dryer sheets, etc (whatever you need to do your laundry). Students also need to bring their own bed linens. (See list of suggested items to bring—in attached packet.)

Laundry Controller

## Meals



Meals are provided daily beginning with breakfast on Tuesday morning, **May 26th, 2015 and concluding with breakfast on Friday, June 26th, 2015**. Breakfast, lunch and dinner will be served in a University campus cafeteria. Weekend meals will be provided for GS students by the GS counselors (take-out or going to a local restaurant within walking distance).

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**What to Bring:** Sporting Equipment, Music Players, and Camera. Bring any of these items you think are appropriate for use during recreation periods. **Do Not Bring Video Games or Gaming Systems**! Bring swimsuits and beach towels for swimming in the campus pool. Light sporting/recreation equipment, such as volleyballs, softball equipment, or basketballs may be checked out from the Center for Physical Activity.

Students are encouraged to bring cameras to take candid shots of their academic and social experiences. Ms. Haga will be using photos taken from the five week Governor's School for a student yearbook that will be distributed to each student during the closing ceremonies.

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**Personal Items:** If you have a favorite type of pen, pencil, or writing paper, you should bring your own supply of these. You will need a scientific calculator (TI-83 or equivalent). A backpack will be useful for carrying books and supplies to class.

***Please bring Alarm clocks or clock radios. You will need to be up and ready to meet your group in the hall to prepare to leave for breakfast at 7:45 am.*** **There should be no reason whatsoever to be late for the count off**. Remember to bring personal items such as soap, shampoo, sunscreen, or stationary, although the Campus Book Store and local drug stores carry full lines of these items if you need to purchase them during the program.

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## Computers

Each student will have access to computers for in-class use and for completing homework assignments in the computer lab in Brown Hall (science building). These computers can be used for doing their homework and sending e-mail. Students may choose to bring their own personal computers, word processors, but, neither the ***Governor's School nor East Tennessee State University*** will be able to assume any responsibility for damage and/or loss of any student's equipment.

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# University Facilities

## *The Charles C. Sherrod Library*

The Charles C. Sherrod Library, the Main Library on campus, opened in 1987 and holds the general and research collections and a comprehensive collection of bibliographic reference and research collections.

Library hours of operation during the ***Governor's School Program***:

**Summer Semester 2015: June 6, 2015-August 12, 2015**

| | |
|---|---|
| **Mon.- Thurs.** | 8:00AM - 10:00PM |
| **Friday** | 8:00AM - 4:30PM |
| **Saturday** | 11:00AM - 4:00PM |
| **Sunday** | 2:00PM - 10:00PM |
| | **Independence Day** |
| **Saturday July 4, 2015** | Closed |

## ***Campus Recreation*** ***(The Basler Center for Physical Activity)***

Campus Recreation offers a wide variety of physical activities and recreational sports for the entire ETSU community - students, faculty, and staff. Programs are offered in five areas: fitness, intramurals, non-credit instruction, outdoor adventure, and sports clubs. The center for Physical Activity and Basler Challenge Course serve as the foundation for these programs.

The Basler Center for Physical Activity contains an aerobics/martial arts studio, basketball/volleyball courts, climbing wall, indoor soccer field, pool, racquetball/squash courts, and an enormous weight room.

***Hour of operation Summer, 2015***
***Building hours***
Monday-Wednesday-Friday: 6:30a.m. - 8:00p.m.
Tuesday-Thursday: 8:00a.m. - 8:00p.m.
Closed Weekends

***Pool hours***
Monday-Wednesday-Friday: 7:00a.m.-9:00 a.m.; 11:00a.m.-1:00p.m.; 4:00p.m.-7:00p.m.
Tuesday-Thursday: 10:00a.m.-1:00 p.m.; 4:00p.m.-7:00p.m.
Closed Weekends

Family Swim Night on Friday nights from 6:00p.m.-7:30p.m.

***Hours are subjected to change during breaks and holidays***.

You will receive specific instructions on the use of the pool. There is no charge to students for use of these facilities and no charge for lockers.

## *The University Bookstore:*


***The University Bookstore*** is located on the second level of the D. P. Culp University Center and is open Monday - Friday, 7:45a.m-6:00p.m. The Bookstore carries a supply of new and used textbooks, paperbacks, school and office supplies, computer supplies, art supplies, stationery and greeting cards, tee shirts, sweatshirts, caps, and lots of other clothing. Traveler' check cashing service is offered to students, faculty, and staff. For more information call 423-439-4436.


University Bookstore

***The University Bookstore***

***Summer hours: 8:00a.m. until 4:30p.m.*** Extended hours at the beginning of each semester.

## *The D.P. Culp University Center*

***The D.P. Culp University Center*** is a modern architecturally designed student center, conveniently located in the heart of campus. The specific purpose of the center is to serve the students by providing an informal setting to enhance their educational, social and cultural interests. The Culp University Center provides a wide variety of services, entertainment, and social activities for the campus community. The D.P. Culp University Center Office phone number is 439-4342.

During the summer semester, The D.P. Culp University Center is open as follows:

***Summer Building Hours:***

| | |
|---|---|
| **Monday - Thursday:** | **8:00am - 7:00pm** |
| **Friday:** | **8:00am - 5:00pm** |
| **Saturday & Sunday:** | **Closed** |

The services of interest to students include:

- Lounge and study facilities
- University Post Office – stamp sales, money orders and other related services
- Food Services – *The Marketplace, the Atrium Food Court, the Buc Mart/Quiznos, and the Cave.*
- Banquet and Conference Facilities
- ETSU Book and Supply Store (Nebraska Bookstore) for textbooks, supplies and personal items
- Administrative Offices

## Religious Centers (Campus Ministries)

The Campus Ministry Association at ETSU is comprised of eleven denominational and nondenominational religious organizations which include: Baptist Collegiate Ministry, Campus Crusade for Christ, Catholic Campus Ministry, Christian Student Fellowship, Episcopal University Ministries, Presbyterian Campus Ministry, United Methodist Student, The Well, Reform University Fellowship, Chi Alpha and Young Life. In addition, several groups have off-campus student centers for their activities. For those students who stay on the campus on the weekends, many religious organizations offer transportation to Sunday Worship services at local churches. For contact information on any of these organizations please call the Student Organization Resource Center, 439-6633.

Students are able to attend religious services of their choice if their parent collects them on Sunday morning and returns them to the dorm by 9:00pm on Sunday.

## Miscellaneous:

Any student having special dietary needs or medical needs will be accommodated. Phone conversation or email of such needs by the student's parent must be provided to the Governor's School Co-Director and Executive Coordinator, Angela Haga prior to the beginning of the program or else such needs will be problematic.

***Students may bring a microwave if they so desire for their dorm room***. Ms. Haga will provide the student's with their dorm room partner's name, phone number, and email addresses so they may choose what items each will bring for their dorm room prior to opening day. (This information will be emailed to each student as soon as all required documentation is returned to Ms. Haga).

Physicians in the Student Health Clinic may administer allergy shots. The clinic is open 8:00a.m. through 4:30p.m. Monday-Friday. The clinic is located in Room 160, Roy Nicks Hall, (423) 439-4225.

## Operating Policies in the Governor's School for Scientific Models and Data Analysis

### *Standards of Conduct:*

**East Tennessee State University has certain standards of conduct that apply to students. As guests of the University, Governor's School students are expected to follow the University standards of conduct, as well as rules that pertain only to Governor's School students.**

**A team of conscientious male and female Governor's School Counselors will ensure a pleasant and enjoyable stay, complemented by exciting recreational activities. Please note that the Governor's School Counselors are empowered to enforce all the standards of expected behavior and the School Director will have the authority to dismiss a student from the Governor's School Program for flagrant or repeated violations of these standards.**

# University Standards

**The following are unacceptable acts in the University community and may result in immediate dismissal of anyone committing any of these acts.**

- Vandalism, malicious destruction, damage, or misuse of private or public property, including library materials.
- Physical abuse of any person on University owned or controlled property or at University sponsored/supervised functions, or conduct that threatens or endangers the health or safety of any person.
- Use and/or possession, (or being under the influence of) alcohol, marijuana or any narcotic, stimulant, hallucinogenic drug. Such use violates state and federal law on University owned or controlled property or at University sponsored/supervised events.
- Possession, while on University owned or controlled property or supervised activities, of any weapon such as, but not limited to, rifles, shotguns, ammunition, hand-guns, and air guns, including explosives, such as firecrackers.
- Sexual harassment by any member (faculty, staff, students, applicants) of the University community is a violation of Federal and State laws and University policy.
- ***There will be no clubs, governing student body, or groups (clicks, etc.) associated with the Governor's School for Scientific Models and Data Analysis***. There will be ***no student leader*** for the Governor's School students. Every student has the same ability to voice his or her own opinions. Each student will be treated fairly and justly, no student will be treated superior or inferior to another student. If a student has a problem then that student will approach a counselor. If the counselor cannot satisfactorily deal with the problem, the director**, Dr. Jack Rhoton** will be contacted.

# Governor's School Standards

- Students in the program are expected to use only the University facilities appropriate for participation in the ***Governor's School***. **Off-limits to *Governor's School* students are: (a) residence halls other than the one assigned, (b) classrooms or other facilities used by other programs on campus.**
- **Governor's School students are expected to attend all scheduled activities and events. No exceptions unless student is very sick!** Any absences will be reported to the School Director, and flagrant unauthorized absences will result in ***dismissal from the program.***
- **Repeated failure to complete classroom assignments and projects on time is cause for dismissal from the program.**
- **Leaving campus for a local destination is not permitted at any time for any reason. Students will NOT be excused from the Governor's School to visit relatives, or to attend family vacations, etc**. In the event of ***BONA FIDE*** emergencies, students will be released with the authorization of the assistant director (Angela Haga) and/or the School Director (Dr. Jack Rhoton). The parent or guardian must contact the assistant director (Angela Haga) to authorize release of the student and to identify who will pick up the student.
- Smoking and use of smokeless tobacco are **prohibited** during the Governor's School.

Main Campus Perimeter: Students are not to leave the convenient perimeter comprising the campus of East Tennessee State University and bounded by State of Franklin Avenue on the north, and the railroad tracks at the west at any time.

Safety: The University is generally a safe community with many well-lighted routes. For their own safety, students are expected to walk only in groups of three or more and in the company of a GS counselor any time they are out of the dormitory (Luntsford Hall). **It is important that parents and students familiarize themselves with all rules and policies described throughout this handbook. A thorough understanding and cooperation by students and parents will help to ensure the smooth operation for the *Governor's School Program***.

Emergency Situations: In any emergency situation, students should notify the lead counselor and campus security. The ETSU Police Department (Public Safety) operates on a 24-hour per day basis. A police dispatcher is always available to take information or full reports. All 911 calls placed on campus telephones are routed to the Johnson City E-911/EMS emergency dispatch center. The call is dispatched to Johnson City Police for response. All calls, which are not of any emergency nature, should be made directly to the ETSU Police Department by calling (423) 439-4480.

There are towers with Blue light emergency telephones (or call boxes) that are located at various sites on the campus. Pushing one of two buttons (a large button that connects directly to the E-911 Dispatcher or a smaller button which contact the University's escort service) activates the call boxes. In response to a call from an emergency blue-light telephone, police officers are immediately dispatched to the location of the call or complaint. The location of the emergency blue-light call boxes is noted

on the ETSU Campus Parking Map, which will be provided. In the dorms, students should report at once any unknown or suspicious individuals or other problems to one of the counselor's. The counselor will then take the required precautions.

## Health Clinic:

**Please be sure to include a copy of your health insurance card to the assistant director Ms. Angela Haga in the event of a medical or other emergency.**

The Student Health Clinic is located on the first floor of Nicks Hall. Same-day appointments are available by call (423) 439-4225. The clinic is open Monday-Friday from 8:00a.m. to 4:30p.m to serve all enrolled students at ETSU. Care is provided by Nurse Practitioners, Registered Nurses, Physicians, and Health Educators. Specialty clinics are also available to students such as women's and men's health on a daily basis. There is no charge for visits to the clinic. Students are only charged for laboratory expenses and any medications that may be dispensed through our pharmacy.

***Student Health Clinic services include:***

- Medical and nursing care for illness and injury
- Referral to other outside health care professional for chronic conditions
- Allergy clinics

***Major treatment is the responsibility of each student and their parents or guardians.***

Students having prescription(s) or needing over-the-counter medication must bring a note from their parent/guardian authorizing the use of such agents.

## Curfew:

A curfew has been established both for the safety of the students and to support development of their responsibility.

**On weekday nights, Monday through Friday and on Saturdays and Sundays, all students are to be in the residence hall by 10:00p.m, and in their individual rooms and lights out by 10:30pm.** ***Counselors are with the Governor's School students 24 hours a day, seven days a week.*** **At no time are the students left alone for any reason. Each student will be required to sign a form that states they will abide by the rules of the Governor's School and East Tennessee State University while on the university campus and when they are attending field trips off-campus with counselors, professors, and staff.** ***If the student shows disruptive behavior of any sort or violates the rules in any way it will be considered as an automatic dismissal from the program.***

## Luntsford Apartments Security & Safety Regulations and Procedures

A uniform set of regulations exists for the safety and comfort of all people in the dormitory. As members of the university community this summer, students are expected to adhere responsibly to these regulations.

| | |
|---|---|
| **1.** | ***Students in the program are expected to follow all instructions and directions from their counselors.*** These instructions and directions will always be fair, sensible, and sensitive to each individual student's need. |
| **2.** | Room assignments will be made by Ms. Angela Haga, the co-director and executive coordinator for the program. Part of the college experience is learning to get along with roommates. **Room changes cannot be made without the school assistant director's (Angela Haga) approval.** |
| **3.** | Female students are not allowed in the rooms of the dormitory assigned to male students and vice-versa. |
| **4.** | ***Students are expected at all times to wear a provided name badge on campus and follow the curfew rules.*** |
| **5.** | Dormitory windows are not to be opened. Objects may not be thrown out of dormitory windows. |
| **6.** | Pets are not permitted in the dormitory at any time for any reason. |
| **7.** | Students are expected to show consideration for others at all times and to avoid excessive noise ***including loud music.*** |
| **8.** | Students are not permitted to use nails, tacks, or screws in the walls or woodwork anywhere in the dormitory facility. |
| 9. | Students may not install any attachments to the telephone. Students are responsible for any damage or loss of telephone equipment. |
| **10.** | ***It is the responsibility of each student to personally maintain his/her assigned room. The room must be cleaned and the trash taken out before final check out.*** Items that are flammable (fuel, etc.) may not be stored in student's rooms. Items that require an open flame to operate (such as lighted candles, incense, Bunsen burners, or alcohol burners) or which produce heat (such as hot plates or popcorn poppers) are not allowed in resident's rooms. |

## Remedies to Address Violations of Operating Policies

In our past experience, the ***Governor's School*** students have generally been outstanding young ladies and gentlemen who are very conscientious and display the highest and most commendable standards of conduct. For the sake of every student's welfare, security and safety, the Governor's School Counselors, Teaching Associates, and Faculty will promptly report to the ***Governor's School Director*** (Dr. Jack Rhoton) any violation of the standards of conduct, and, most importantly, of the security and safety regulations. The School Director and Counselors will sensitively and responsibly impose the following fair remedies on any student who might clearly disregard standards and regulations.

| | |
|---|---|
| 1. | At the first willful violation of any standard or regulation, the offender will be instructed to remain confined to the dormitory (**Luntsford Apartments**) immediately after classes and dinner, and will not be allowed to participate in any evening recreational activity. This remedy will remain in effect for two consecutive evenings following the violation. The ***Governor's School Director*** will also speak with the student to address and solve the problem. |
| 2. | At the second willful violation, the remedies will include the ones described above. In addition, the ***Governor's School Director*** will discuss the situation with the student's parents, and depending on the gravity of the violation, he may dismiss the student. |
| 3. | At the third willful violation, the ***Governor's School Director*** will have no other remedy but immediately to dismiss the student from the program. In this case, the Director will make arrangements with the student's parents to ensure a safe return to the student's home. |

**These remedies have the sincere objective of ensuring your security and safety, as well as welfare and comfort. Prior years' *Governor's School* students appreciated and actually welcomed the presence of these necessary rules, and we are confident you will agree that these rules can make your stay very safe, pleasant and enjoyable.**

# Appendix A

## 2015 Governor's School for Scientific Models and Data Analysis Projects

*Students had the opportunity to be engaged in a variety of research projects. The projects centered around the following topics:* ***Forensic Entomology, Discrete Probability Distribution, Cancer Cells/Cell Culture, Peptide Identification, Probability, Micro-Array Data Analysis*** *and* ***Bayesian Statistics.*** *In each project, model building and data analysis played a critical role and was interwoven in a statistical and biological context. Listed below is a brief description of each project as well as the names of students involved in the research. The students reported their research findings to their parents and university faculty on the last day of the Governor's School.*

---

### Dr. Karl Joplin: (Forensic Entomology)

1. 
2. 
3. 
4. 

Insects perform a valuable service of breaking down carcasses in the environment and are known to utilize dead organisms in a secession that can be used to date time of death where other methods are inconclusive or where evidence is lacking. We have utilized new pieces of liver to collect species that appear on dead meat to ask how many species are involved, how the species composition change with time and what is the natural history of this secession.

---

### Dr. Hugh Miller : (Cancer Cells/Cell Culture)

1. 
2. 
3. 
4. 
5. 
6. 

A lymphoma cell line called U937 appears to have heterogeneous sizes. The students tried to answer the question; does the size of U937 cells change as the cells age in culture? Cells that had been cultured for various times were applied to microscope slides and images of random fields were captured. Cell areas were analyzed using the Image J software.

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### Dr. Nicole Lewis: (Discrete Probability Distributions)

1. 
2. 
3. 
4. 

a. Discuss and provide examples for these discrete probability distributions.
b. Under what conditions do they give similar probabilities?

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### Dr. Nicole Lewis: (Peptide Identification)

1. 
2. 
3. 
4. 

Proteomics is a vast analysis of proteins, particularly their structure, function, abundances, and variations and modifications. In proteomics, scientists begin with the protein and work backwards to determine the gene that is responsible for its production. The basic idea of any protein identification method is to match an observed spectrum to a theoretical spectrum of the proposed peptide. It is extremely difficult to identify intact proteins and so the proteins are broken into short peptides and examined separately.

(a) For any given peptide, create the theoretical spectrum using the m/z value of each ion types.
(b) Plot the theoretical spectrum against the observed spectrum and make comparisons.
(c) Determine which ions help reduce the noise peaks in the observed spectrum.
(d) Compare the values of the goodness of fit measures when using different prior beliefs about the probability of observing a peak (presence of an ion).

## Dr. Nicole Lewis : (Probability)

1. 3.
2. 4.

Probability – Sampling With Replacement versus Sampling without Replacement.

A box contains *n* tickets numbered 1, 2, …, *n*. A random sample of *n* tickets is selected from the box, one at a time. A "match" occurs if the ticket numbered *i* is selected on the $i^{th}$ draw.

A. Find the probability of at least one match if sampling is done
   - With replacement
   - Without replacement

B. What happens as *n* reaches infinity?

---

## Dr. Karl Joplin (Micro-Array Data Analysis)

1. 3.
2. 4.

Students were introduced to microarray data from a study of diapausing and non-diapausing flesh flies, *Sarcophaga crassipalpis*. The data were normalized and examined for genes that are diapause up- or down-regulated during this developmental state. Genes were then identified using the GenBank dataset.

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## Dr. Lewis (Bayesian Statistics)

1. 3.
2. 4.

Spin a penny on a table. Let p denote the probability that it lands heads. We want to estimate this probability starting with different prior beliefs about p**.**

A. We will use a histogram to model the prior belief.
B. We will use a uniform prior.
C. Simulate the posterior distributions from the priors and compare the results. Suppose one is interested in predicting the number of heads y in a future sample of size 25. Compute the predictive probabilities of y using the different priors. Compare the results.

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## Appendix B

# Governor's School for Scientific Models and Data Analysis

*Biology for Science Majors-{Lecture I and Lab I}*
*Problem Stats/Non-Calculus-{Lecture}*

### BIOL 1110-012 Biology for Science Majors- Lecture I (3 hrs.)

Core requisite: BIOL 1111-012
The principles of molecular and cellular biology, including metabolism and genetic inheritance.
Designed for biology majors, minors, and others who plan to take upper-level courses for which this is a pre requisite.
This course contains three (3) hours of lecture and two hours of lab.
A common grade will be given in BIOL 1110-012/1111-012.

### BIOL 1111-012 Biology for Science Majors- Lab I (1 hr.)

Core requisite(s): BIOL 1110-012.
Laboratory exercises to gain the ability to identify and use the processes of biological science with materials corresponding to Biology for Science Majors Lecture I.
This course contains one (2) two-hour lab per week.
A common grade will be given in BIOL 1110/11.

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### MATH 1530-014 Prob/Stats {Non-calculus]- (3 hr.)

Prerequisite(s): Two years of high school algebra. Descriptive statistics and its relevance, including probability, experimentation, measurement, sampling and surveys, informal statistical inference, and hypothesis testing are included.

Algebra- Laws of exponents, polynomials, factoring, rational expressions, radicals, quadratic equations.

Reading proficiencies, acquisition of general vocabulary and discipline-specific terminology, recognition and expression of super-ordinate and subordinate concepts, interpretation of an author(s)? purpose, opinion, and tone, fluency in reading, thoughtful response to written information and narration, summarization, and research techniques.

# Governor's School for Scientific Models and Data Analysis

**East Tennessee State University**

***Department s of Biological Sciences and Mathematics***

Course: **IBMS 1100 SYMBIOSIS I**

Number of credits 7- (4 for Biology, 3 for Statistics)

Number of hours per week: 5 hours of lecture and 2 hours of lab

## Objectives:

To present Biology as a science that is dependent on quantitative analysis of data. The course covers aspects of biology such as Introduction to the cell and cell growth, effects of size increase on organisms, Mendelian genetics, DNA replication and genomic content and how these characteristics can change over time by Evolutionary processes. To introduce Probability, Descriptive Statistics and Statistical Inference in the context of the study of Biology. The course covers the typical content of an introductory statistics course plus some additional topics. The notion of statistical inference is introduced very early in the course by means of randomization tests and the exact sampling distribution of the sample proportion based on the Binomial distribution. The examples in probability are mainly oriented toward topics of interest in genetics and bio-informatics s at an elementary level.

**IBMS 1100** is the first course in a 3 course sequence that integrates biology, statistics, and mathematics, As a result, the mathematics and statistics is introduced, explored, and developed in biological contexts, including surface area to volume ratios, isometric and allometric scaling, fractals in biology, and difference equations and discrete systems in genetics, evolution, and the study of DNA. Pre-calculus concepts and limits are also introduced and developed in IBMS 1100, both due to the natural contexts which arise for doing so (such as log-log plots) and because a major goal of the Symbiosis project is to spread the coverage of calculus I across 2 semesters as a way of promoting greater student success in both calculus comprehension and skill development.

**Teaching method:** Lectures were prepared mainly in power-point. Hands-on class activities and data analysis in the computer lab were used when appropriate on addition to the wet/dry lab component.

**Textbook***:* Complete class notes, on addition to power point presentations, were written for this course by the instructors under a grant from HHMI, they are available from the D2L platform.

***Statistical software*: Minitab, R, Maple, Java Applications, Image J, Web-based Applets and Activities**

## Module 1. - The Scientific Method

The study of ***Biology*** is introduced. Aspects of what hypotheses are and how they are tested leads into statistical inference. Examples of hypothesis testing such as von Helmont's plant growth test and Stanley Prussiner's Prion Hypothesis are discussed. An introduction of Arbovirus infection of Yellow Fever leads to a discussion of viruses and definition of life. The hypothesis of whether AIDS can be transmitted by mosquitoes is used as an example of the use of quantitative biology. The five themes of biology are introduced as the thread of further modules.

What is ***Statistics***? Role of Statistics in the Scientific Method. An introduction to the role of Mathematics and Statistics in Science in general. Randomization test to test the hypothesis of equal means (medians, variances) of two populations based on experimental data. Why do we study probability? Basic definitions: Random experiment, sample space, event. Definitions of probability: classical, relative frequency, axiomatic definition and its consequences. Independent events. Replicates of a random experiment. Pascal triangle and basic combinatorics. Types of random variables, mass or probability function and density functions. Discrete probability distributions. Binomial distribution. Applying the Binomial distribution to do test of hypothesis about a population proportion. First glance at the limit concept (probability as limit of a relative frequency, along with difficulties in using such a definition). First glance at mathematical models.

## Module 2. - The Cell and Statistics

Introduction to the cell. What is the cell and why are they small? What is the concept of multi-cellularity? The organization of the cell and what are the consequences of the components functions. TANSTAAFL (There ain't no such thing as a free lunch), a more wide ranging discussion of consequences starting from the more formally known Second Law of Thermodynamics. The transmission of information into and out of the cell. The cell cycle and Mitosis as a consequence of cell growth, repair and quiescence. Data production: observational studies and experiments. Basic definitions: Population, sample, individual, variables (categorical & quantitative).

Displaying and summarizing data for categorical variables, tables and graphs, relative risk, odds ratio, measuring agreement in matched-pairs situations. Displaying and summarizing data for quantitative variables, tables and graphs for one, two and several variables at the time. What are the data telling us? How to decide between the different statistical graphs? Location (mean vs. median, five number summaries) and variability statistics. Sources of variability. Looking at paired data. Correlation. What is statistical inference? Introducing the idea of sampling variability and sampling distribution. Exact sampling distribution of a sample proportion (based on the Binomial distribution) and its application to hypothesis testing and estimating with confidence. Bootstrapping to do inference about a population mean. Randomization or permutation test to test hypotheses about a parameter (mean, median or variance) in two populations.

## Module 3.-Size and Scale

What happens to an organism as it grows bigger? Can ants really toss locomotives off the tracks? Can King Kong jump off the Empire State Building? Can Tyrannosaurus Rex really run at 80 kph? This module examines the functions that describe what happens when organisms grow (or shrink). Included are organism size as a determining factor in shape, the differences between isometry and allometry, problems with isometric scaling in biology, bacteria size, shape, organization, cell wall structure, and other characteristics. Exponential growth of Bacterial populations. Biological models with mass as the independent variable. Area, volume, and surface area to volume ratio. Isometric scaling, slope, equations of lines, allometry and power laws. Limits as tools for approximation. The exponential function. Logarithms. Linear regression and transformed variables. Normal distribution, Fractal Geometry as it relates to biological organisms and the surface area to volume ratio.

## Module 4- Mendelian Genetics

Why was Gregor Mendel able to elucidate the laws that determine how organisms pass genetic information from one generation to the next? This crucial process was discovered and then ignored for almost 40 years and yet was the key that Darwin was missing to explain Evolution. The data and processes that Mendel used to determine these principles are examined. In this context, Meiosis is described as the cellular equivalent of Mendelian Laws.

A coin model to understand genotypes and phenotypes for all combinations of homozygous and heterozygous parents. Punnet squares and probability trees, 'back- testing'. Comparing experimental results with the expected results under an assumed model: Chi-square test of goodness of fit. Review of probability basics. Chi-square test of independence. Fisher's exact test. Test of homogeneity. Describing dependence with relative risk and odds ratio. Conditional probability and Bayes rule. Discrete distributions, expected value and variance, discrete uniform, Bernoulli, Binomial and its use to test hypotheses about a population proportion. Power of a test. Determining sample size based on the desired power for a test. Poisson distribution, binomial and normal approximations to the Poisson distribution. Introduction to sampling: population, sampling frame, sampling size,

sampling methods (simple, systematic, cluster, two-stage, stratified), transect sampling, sampling and non-sampling error, capture/recapture and distance sampling.

## Module 5- DNA genetics

Mendelian Laws describe how information is passed from generation to generation, but the molecular processes were not determined until the nature and structure of DNA was described. The structure of this molecule and the consequences of replication are covered. Is DNA the same in different organisms? Quantitative tools to look at the composition of the information are developed. DNA as nucleotide sequences, nucleotide frequency, GC content. Independence and conditional probability in the DNA environment. Transition matrix, graph to represent transition matrices. Probability of a given sequence of nucleotides, repeats of a single nucleotide, length of the repeat, geometric distribution. Palindromes, probability of any palindrome and of specific palindromes, space in between palindromes. Comparing two sequences of nucleotides. Similarities that happen just by chance. Random walks (and their use in testing for similarities). Sampling distribution of the sample mean and its use in confidence interval estimation and hypotheses testing. Approximated distribution (normal) of the sample proportion and its use in confidence interval estimation and hypotheses testing. Necessary sample size calculation in the case of estimation based on desired precision and confidence and the case of testing hypothesis based on the desired power. The t-student distribution and its application to inference for the sample mean.

## Module 6- Evolution

"Nothing in Biology makes sense, except in the light of Evolution" by Theodosius Dobzhansky is the quote that sums up the importance of Evolution to Biology. The genetic basis of Evolution has been described and the applications of these principles to examples are covered. Applications of probability and statistics to populations. Evolution as it relates to population size and density. The Wright-fisher model with the Hardy-Weinberg equations as a special case. Rigorous development of the limit concept. Continuity. Discrete dynamical systems. Effect of sample size in the Chi-square test. Introduction to graphs and their use in genetics.

# Appendix C

## *Scholars Attending 2015 Governor's School for Scientific Models and Data Analysis*

**(Sunday, May 24th –Friday, June 26th, 2015)**

| Last Name | First Name | High School | Home City |
|---|---|---|---|
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# Appendix D

## *Student Check List*

**Be sure to bring the following items:**

_____**MANDATORY**: Parent phone #'s (home, work, and cell) and email address!
_____**Proof of Health Insurance** (I need a copy of your insurance card)—**VERY IMPORTANT!**
_____Small microwave (if needed), coffee pot—(a small refrigerator is in your dorm room)
_____Pillow, sheets, comforter, and pillowcase for a twin-size extra-long mattress (39x78" in length)
_____Two light blankets
_____Bath towels, wash cloths, beach towel
_____Spending money can be credit, debit, or check card, or ID Bucs
_____Laundry money and supplies (wash powders, fabric softener, dryer sheets, etc)
_____Lots of Sunscreen (at least a SPF 30), hat, and sunglasses – **YOU WILL BE IN THE SUN A LOT!**
_____Rain gear, umbrella
_____Swimsuit, towels
_____Sturdy, comfortable walking or **TENNIS** shoes - **You will be doing a lot of walking!**
_____Dress clothes for final presentation (closing ceremony will be in the Millennium Centre ballroom
____Backpack/book bag
_____Personal trash cans w/bags
_____Personal toiletries (ex: soap or shower gel, lotion, shampoo, deodorant, toothpaste, toothbrush, dental floss, mouthwash, eye drops, etc) and prescription medications
_____**Alarm Clock** (a necessity—you have to be awake and on time for breakfast and class)
_____**Writing materials** (paper, notebook, pen, pencils, etc.) **VERY IMPORTANT**

**You may consider bringing these items, though they are not necessary:**

_____Sports equipment (ex: Frisbee, football, cards, board games, etc.)
_____Cell phone—may only be used during open time; **cell phones are prohibited during all Governor's School activities**
_____Computer, surge protector, ethernet cord
_____**Digital Camera** (you will want to take lots of photos of your 5 week experience)
____Small radio/CD player

**DO NOT BRING**

- Personal checks
- **Cars**
- Extension cords
- Flammable items (such as candles, popcorn poppers, hot plates, etc.)
- Alcohol and tobacco products
- **Firearms and weapons of any kind**

Please contact me if you have any questions:


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