

Facilities and Other Resources

University of Arkansas

Poultry Research Farm: Complete hatchery facilities are available for all pedigree work. The research farm also includes a Hatchery providing egg storage and new roll in Jamesway incubator/hatchers. Three incinerators are also located on the farm for carcass disposal. The Department's Feed Mill contains mixers capable of producing single-batch diets in quantities ranging from 20 to 2,000 lbs with a total capacity of 10 tons/day, and can produce feed in mash, crumbled or pelleted form.

Building 236A has 1 room with nine 100 sq.ft. floor pens, and three rooms with battery cages. Room A has 160 cages for broiler breeders, while rooms B and C have over 1000 smaller cages. The building has a temperature controlled headhouse with work tables, refrigerator, water, gas, and electricity. Farm technicians are available during weekdays for assistance with bird handling, and care.

Other University Facilities

The Center of Excellence for Poultry Science houses the Central Analytical Laboratory and a fully equipped Histology Preparation facility. The UA DNA Resource Center offers capillary sequencing at nominal costs, along with high throughput DNA isolation, and PCR.

High Performance Computing is available through the Arkansas High performance Computing Center. The sum of all AHPCC compute nodes have 4,985 cores, 13.4TB of memory, about 73 TFlop/s CPU peak performance, 93TB of long-term storage, 374TB of scratch storage, and 96TB of backup storage. Razor Phase II, installed in mid-2012, is an IBM iDataPlex system acquired through NSF grant (Dr. Rhoads was a senior investigator on the proposal) and university funds. It is composed of 112 compute nodes, each with two eight-core Intel Xeon E5-2670 "Sandy Bridge" 2.6 GHz processors, for a total of 1,792 cores and a peak performance of 37.7 TFlop/s. Each node is configured with 32GB of memory. The seven large memory nodes, installed in 2011 and 2012, each have four processors, either AMD or Intel Xeon, 32 to 64 cores, and 256, 512, or 768GB of shared memory. They are connected with QDR or DDR InfiniBand.

Rhoads

Dr. Rhoads' labs consist of two 660 sq.ft. rooms plumbed with air, gas, vacuum, and central deionized water, and each has a fume hood. The labs are in the Ferritor Building which was completed in 2000 and houses most of the research space for Biological Sciences in a card access secured building.

Dr. Rhoads office (330 sq.ft.) is in the adjoining Science Engineering Building (renovated in 2001) along with the departmental offices.

Computing resources: Office- Win7 64 bit CPU with dual monitors, and color laserjet, 2 laptops. Laboratory- 6 workstations with dual monitors, two B/W laser printers. One workstation includes Win7-64bit with 8 cores, 32 GB RAM, 6 TB RAID array, equipped with LaserGene 11 including NGen, QStar and ArrayStar. All machines are networked. File storage is on a network file server maintained by the University with incremental and full backup. The department has a computer graphics set up for scanning and includes a 42 inch HP Epson poster printer.

Other: The departmental office provides grant accounting and secretarial support.

Anthony

Laboratory space assigned to Anthony includes 750 sq. ft. of laboratory space of the fourth floor of the research wing in the 112,000 sq. ft. Poultry Science Center on the Fayetteville campus of the University of Arkansas. The lab is equipped with benches, sinks and 2 chemical hoods. The floor is also equipped with 4 walk in cold rooms, two walk in freezers, and a surgery and animal isolation suite. Additionally, office space (80 sq. ft.) is located in the office wing of the Poultry Science Center. Anthony supervises a 12,000 sq. ft. building that contains 700 individual female cages and 100 male cages for pedigree work and floor pens for rearing chicks. Additional farm facilities include access to a 48 pen curtain sided broiler breeder house. Anthony oversees the utilization of a large hypobaric chamber designed to provide controlled interior environmental conditions of: temperature (+40 to + 90 F), air flow (400 to 800 ft/min), and Altitude (ambient to 10,000 ft). Internal dimensions of the facility are 8'W X 12'L X 8'H and are fitted with cage systems designed to house 480 birds to 3 weeks and 240 birds to 6 weeks. Within the same building is an ambient control room which is identical to the hypobaric chamber in all ways except altitude capabilities. All mechanical equipment utilized to control the test parameters is located remotely (outside the main building). There is a mechanical room containing, a refrigeration/heating system for each chamber and an air mover for the non-altitude room. There is also a blower room containing the blower and its driver which maintains air flow for the hypobaric chamber. Cooling of the chambers is accomplished by an R22 refrigeration system utilizing an evaporator coil placed in the air flow to the chamber. Air is drawn through the coil and fed to the room. Electric heating elements, placed upstream of the refrigeration coil are used to heat the chamber. Room temperature is controlled automatically by a set point controller which controls the cooling and heating systems. The air flow and altitude requirements are set manually by the operator. Additional space for conducting controlled environment studies is the Environmental Research Laboratory. It contains 12 environmental chambers (90 sq. ft. each), each of which is designed to house 100 broilers up to 42 days of age under independently regulated temperature, humidity, ventilation, and lighting regimens. The Cool Temperature protocols for inducing ascites can be conducted in the Poultry Environmental Research Laboratory environmental chambers. Complete hatchery facilities are available for all pedigree work.

Kong

Laboratory Facilities: The investigator has office and lab space (1200 ft²) in the \$20 million J.W. Tyson Building (110,000 ft²) that houses the Center of Excellence for Poultry Science. The Co-PD/PI also has access to approximately 4000 ft² of shared laboratory space including walk-in coolers/freezers, dark room, tissue culture facility, microscopy room, autoclaves, as well as a complete surgical facility.

Poultry Research Farm Complex. Facilities at the Poultry Research Farm Complex (5 min from campus) include broiler rearing facilities, hatchery, feed mill, pilot processing plant and the poultry environmental physiology laboratory on the Poultry Farm contains 12 environmental chambers (10'x 12'x 8' ea), and a necropsy area.

Animal Housing: Adequate housing and animal care facilities for chickens are available in the departmental Poultry Research Farm Complex. Animal care is provided by the department on a daily cost basis to users. Veterinary supervision is provided by the department

Office/Secretarial: Basic office supplies and secretarial assistance is available through the Dept. of Poultry Sciences.

Schmidt Laboratory University of Delaware

Laboratory: A 800 ft² space in the Allen Biosciences Laboratory. The laboratory contains chemical and tissue culture hood, incubators for both microbiological and tissue cultures, inverted microscope, and

all essential equipment for modern molecular biology. The University of Delaware also owns an Illumina G2 DNA sequence analyzer, PacBio and provides bioinformatic support for data analysis.

Computers: The laboratory is equipped with five recently purchased Macs along with a PC. In addition, this laboratory has three linux servers with 518 Gb RAM, 64 processors along with 16 terabytes of hard drive space, and is maintained by the College of Agriculture systems administrator.

Other Resources: Delaware Biotechnology Institute: The BioIT Center at the Institute houses a compute cluster, a database cluster, a visualization studio, along with multiple specialized servers. The BioIT Center has a Sun Microsystems SunFire V60x Linux Compute Cluster, featuring 128 dual processor 2.8 GHz Xeon CPUs, a 48-Node Myrinet Switch, 160 Gigabyte of Memory, and over a Terabyte of disk storage. Since that time, the cluster has been upgraded to include seven quad-processor Sunfire X4100M2 nodes. In support of the organization and analysis of the rapidly growing amount of genomic and proteomic data, a cluster of six Sun Microsystems SunFire X4200M2 systems is available as a database server. Each system has 4 AMD64 cores, 16GB memory, and 300GB local disk space. In addition, an Apple 10.5TB RAID array, a 840GB Sun RAID array, and a 480GB Sun JBOD array are available as shared storage across all servers.

MySQL and Oracle database systems are available on the SunFire X4200's to organize, store and evaluate the rapidly growing amount of data, both from external databases as well from internal sources such as the microarray center, the mass spec facilities in the proteomics center, the bioimaging center and from several DNA sequencers in the DBI Network. Complementing its computational resources, the Bioinformatics Center offers access to a variety of bioinformatics analysis tools, with state-wide licenses in place for Vector and Xpression NTI, and Sequencher as well as a broad number of publicly available sequence analysis programs. In addition, several software tools used for biomolecular modeling and visualization, including Gaussian, MOE, Amira, and Spider, have been installed at the BioIT Center to meet the needs of the biochemistry community for protein simulation and analysis.

The Visualization Studio, one of the first in the country to be dedicated primarily to life-sciences research and education, is essentially a darkened room with a 100-ft² screen, providing an interactive, immersive, 3D graphics environment for up to ten researchers and students. A pair of digital projectors that are positioned behind the 15ft x 7ft screen deliver a rear-projected, edge-blended image with a total resolution of 2240x1024 pixels. Ultrasonic sensors mounted in the ceiling of the studio track the motion of the lead researcher's head and of a handheld 3-D wand, allowing for an experience where the team members can literally immerse themselves within the data. The display is driven by two servers. An eight-processor Silicon Graphics Prism visualization supercomputer with four graphics pipelines provides a Linux environment with the power of the SGI graphics software. A dual-core HP AMD64 with a high-end NVidia graphics processor will allow the wealth of Windows software to be utilized.

Dr. Shawn Polson serves as Manager of the BioIT Center, and database support of faculty projects is provided by Dr. Mihailo Kaplarevic as Database Administrator. Desktop support is provided by Mr. Eric Garrison as Systems Administrator II.