



Facilities

School of Medical and Health Sciences

The School of Medical and Health Sciences operates a number of working laboratories in each of its study areas. Our laboratories are fully equipped with some of the most state of the art equipment available for use by undergraduate and postgraduate students in Australia. The School also operates an extensive number of highly specialized research areas within each discipline area.

Exercise Science

Our exercise laboratories are considered some of the best in the Southern Hemisphere. We attract high performance sports teams for testing, including the AIS and Cycling Australia professional cycling teams, the West Coast Eagles, Perth Wildcats and many other elite athletes.

Exercise Physiology – Room 19.150

The Exercise Physiology research laboratory has state of the art facilities and equipment. Within this laboratory we have separate room/areas for fitness and exercise testing, neuromuscular assessment, heat and hydration assessment, blood and tissue collection and sample preparation. Within this laboratory we also have specialized equipment for examining environmental stress (i.e. environmental chamber), blood flow, sweat response, exercise induced muscle damage and neuromuscular fatigue. This laboratory is predominantly used for research and graduate classes yet our undergraduate students also use this laboratory within several units.



Exercise Physiology equipment identifies the physiological mechanisms underlying physical activity



Researchers measuring muscle strength using the Biodex

Exercise Physiology – Rooms 17.101/102

The teaching laboratory space of Rooms 17.101/102 is used by variety of units taught as part of our Bachelor of Science (Exercise and Sports Science) degree program. The first year unit SPS1104 Principles of Exercise Programming provides students with an understanding of exercise prescription. The second year unit SPS2201 Exercise Physiology 1 (Cardiorespiratory) focuses on the effects that exercise has on the cardio respiratory system. The third year unit SPS3301 Exercise Physiology 2 (Applied Physiology) aims to expand on student's prior learning and focuses on the application of exercise physiology principles in a laboratory setting.

Anatomy – Room 17.105

This laboratory space is primarily used for the teaching of our fundamental anatomy unit EBH1101 Human Anatomy. This space is also used for instruction in SPS2202 Care and Prevention of Injuries. Students also receive instruction on exercise rehabilitation in this laboratory during the unit SPS2301 Exercise Rehabilitation.

General Laboratory – Room 17.104

This general laboratory space has surround sound, mirrored walls and run-through capabilities. Units taught within this room include SPS1107 Sports Science Applications 1, SPS3206 Performance Studies 4 (Dance) and SPS2301 Exercise Rehabilitation.

Strength and Conditioning lab – Room 19.149

This laboratory is predominantly used for research purposes and professional outreach with the Australian Strength and Conditioning Association and Australian Weightlifting Federation. In addition to the research focus the laboratory is used for hands on teaching activities, Specifically, undergraduate students gain access to hands-on instruction in resistance training techniques and lifting performance in SPS2203 Principles and Practices of Resistance Training. Additionally, post-graduate students also use this laboratory to develop hands on technical skills as part of SPS6105: Practicum in Strength and Conditioning.



Weight lifting illustrating lifting techniques and measuring performance



3D motion capture being used to understand how children's perception of how far they can reach affects how they play

Nutrition

Food Laboratory - Room 21.101

The dedicated nutrition laboratory is designed for students to work on practical projects involving food. The multi-functional laboratory has a food demonstration and teaching area, computing stations for dietary analysis and diet development and individual or group work areas for food preparation, cooking and tasting, and food analysis. Students have access to small equipment such as microwave/convection heating facilities, gas hotplates, modern freezers, automatic dishwashers, gelometers, and anthropometric equipment for nutritional assessment. Computer software for dietary analysis of dietary plans is available in the Nutrition laboratory as well as in the e-Labs.



Preparing foods for analysis

Dietetics

Body Composition Laboratory – Room 21.233

Our body composition room consists of equipment for anthropometric measurements and a COSMED BODPOD for determining body composition through Air Displacement Plethysmography. This machine is assessed as the gold-standard in human densitometry measuring, and unlike dual-energy X-ray densitometry there is no exposure to radiation. Our BODPOD also has a paediatric option, and has been shown to be a safe, comfortable, reliable and accurate instrument in children. Our room is set up for paediatric testing with decorations and activities. A complete assessment takes 15 to 20 minutes for adults and about 30 to 40 minutes for young children (we progress slower for children to make sure they are comfortable and understand what is happening).



Assessors performing measurements to determine body fat composition by measuring and recording, analysing specific dimensions such as height weight, skinfold thickness and body circumference at the waist , hip and chest

Sample Preparation Laboratory -21.249

This is a new laboratory to enable analysis of blood, urine and stool samples. The room includes scales, a refrigerated centrifuge, freezers, bench space for preparation work and fume hood.

SMHS is supporting a collaborative research space for PG students who are supervised across schools and need access to a shared facility to handle and process bio specimens.

The labs (both) are also a training ground for the UG students who assist with research projects and develop skills in patient management.

Occupational Therapy

Occupational Therapy laboratories and teaching suites have specialised equipment for studying OT, gaining hands-on skills in physical rehabilitation, assistive technology and communication technology. Students learn to understand factors that affect performance in occupations of self-care, education, work, social participation, play and leisure for individuals, groups and populations throughout their lifespan.

Functional Science Laboratory- Room 21.107

Occupational Therapy has three world standard, purpose built laboratories including the Functional Science lab with three smaller breakout areas for simulation of a home or office environment. The bedroom is equipped with the latest environmental control technology. The Paramedical Science students also use these rooms for training.

Assistive Technology Laboratory – Room 21.111

The Assistive Technology lab has computers with cutting edge assistive technology software programs and is used for teaching upper limb orthotics, wheelchair and seating prescription. A large carpeted laboratory room is used for teaching paediatrics, group work and counselling.



ECU students have access to the latest technology in rehabilitation. Students in the Occupational Therapy course learn to use the Bioness H200 (seen here) which offers a wireless option for functional electrical stimulation. As evidenced in the literature, such stimulation can be used to ensure adequate repetition and intensity of rehabilitation to enhance upper limb function in adolescents and adults following neurological illness/injury.

Medical and Biomedical Science

The School's purpose-built laboratories are fully-equipped with state-of-the-art equipment and cater to a whole range of functions in biomedical and medical science. Medical Science laboratories includes anatomy, microbiology, genetics, histology, physiology and biochemistry facilities, along with fluorescence microscopy and digital imaging.

Anatomy and Physiology - Room 17.202

17.202 is a general purpose laboratory with the capacity to run laboratory based units from multiple biomedical science disciplines. The space permanently contains a fume cupboard, compound microscopes, UV Vis spectrophotometers and a biological safety cabinet with benches that can be reconfigured for optimal seating arrangements, currently between 20 and 24 places. Different equipment are available to be used in the room if necessary, such as portable fume cupboards and histology equipment. The current laboratory based units utilizing the room are ECU College human anatomy, ECU College human physiology, introductory and advanced forensic laboratory skills, human

reproduction, biomedical techniques training, biochemistry for 2nd and 3rd years for the medical, dietetics and biomedical programs and human disease studies.

Anatomy Licensed Facility - Room 17.205

Room 17.205 is the recently renovated human anatomy facility which utilizes the University's extensive collection of human cadaver specimens. The collection is a mixture of plastinated and preserved pieces specifically prosected for ECU by UWAs department of Anatomy through their human body donation program. The real specimens are supplemented by an extensive model collection that is also held in the room, including 3D printed items. The space is covered under the Anatomy Act of 1930 and carries a special anatomy license, one of only a handful in the state. The laboratory contains a fume cupboard and specially designed down draft sinks to protect the users from formalin, and the powerful custom air-conditioning system turn the air over in the room every few minutes for freshness and quality. The fixed nature of the down draft extraction means there are 20 places only and each user has their own microscope. All the benches have gas and vacuum services and there are portable extraction cabinets for extra specimen management. The room is primarily devoted to the study of human anatomy through various units for first year students, and physiology for first and second years, and is also utilized by other schools such as Law for units with an anatomy based components. The Masters of Reproductive Technology will utilise this space in 2017.

Microbiology Laboratory - Room 17.213

Room 17.213 is a specialist microbiology facility with an attached anteroom operating under enforced Physical Containment Level 2 conditions. The anteroom is a preparation area for risk level 2 microorganisms and is only accessible to trained staff. The room contains a fume cupboard and two biological safety cabinets that are complemented by central sink systems that are accessible from any work station. Brand new state of the art phase contrast microscopes were installed in the room in 2016 which will be utilized in the Masters of Assisted Reproductive Technology. The fixed nature of the benches mean class sizes are set at 20 students. Second year Microbiology for the medical and biomedical programs run in this laboratory and the special sinks are utilized for heamatology and histology units as well. Any unit which needs a sterile microbiological space to use microbes can be run in this laboratory.



Semen analysis laboratory in progress associated with the Master of Assisted Reproductive Technology and also 3rd Year Human Reproduction, Development and Ageing unit.

Genetics Laboratory - Room 17.222

Room 17.222 is a specialist genetics space that houses all the necessary equipment that would be found in a modern genetics facility. There are 20 work stations on a fixed bench system that contain microscopes, weigh balances, microfuges, centrifuges, sterilizing equipment, and PCR machines. Full pipette stations are available to every station and the room has 4 fume cupboards for student safety. Students have access to nanodrop technology, thermo cyclers, and modern DNA gel imaging systems, QIAxcel RNA analysis system and more. Because of the specialist nature of the equipment in the room it can also be used for Immunology, developmental biology, forensic genetics and advanced biomedical techniques training.



Students in 17.222 using the microscope to view a preparation of their chromosomes!



Students in 17.222 performing techniques in the Immunology unit

Research – Rooms 17.301 to 17.32

Level 3 of Building 17, is the SMHS biomedical research area. There are several key research interests which includes Alzheimer's, Melanoma, Genomics, Huntington's, Assisted Reproductive Technology, Environmental and Dietary impact on humans, Epigenetics, Maternal and Child health research.

These research areas are supported by our research facilities, which allow our researchers to utilise techniques such as microscopy, histology, cell culture, genome sequencing, flow cytometry, to name just a few.

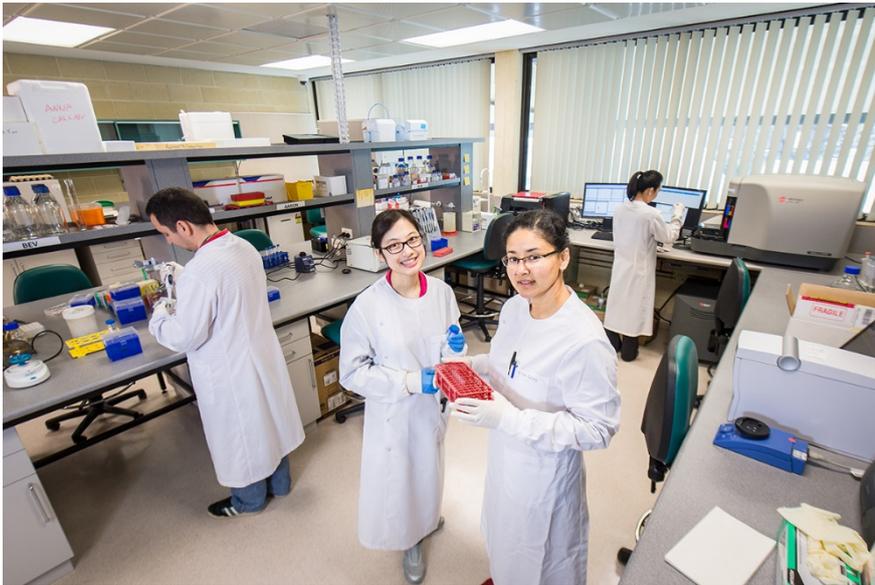
The equipment is state of the art and researchers from other schools within ECU as well as local, national and international organisations, work within the area. Many areas of research are collaborative within Australia and globally.



The SMHS's research facilities are home to state of the art research infrastructure to support a range of multidisciplinary studies. The facilities support a wide range of investigative techniques including genetic analyses (from genotyping and gene expression through to droplet digital PCR and sequencing), proteomic research (multiplex analysis of proteins), and cell based studies (flow cytometry)



The SMHS's cell culture facility supports key research within the school. The facility enables our researchers to utilise both primary cells and tissue cultures to investigate basic cell biology and possible therapeutic affects in areas of interest. The activities must be performed in sterile conditions using class II biosafety cabinets



Dr Elin Gray, Ms Michelle Pereira, Dr Carlos Aya Bonilla and Dr Leslie Calapre isolating circulating tumour cells from the blood of melanoma patients

Paramedical Science

Paramedical Science Suite - Room 21.301/302 and 19.109

The paramedical suite equipment provides a realistic pre- hospital environment by replicating all the requirements of a working ambulance with the supporting materials. The suite contains state of the art manikins for simulation of emergency medical situations without the need for actors. Students can practice emergency medicine on training dummies under the supervision of working paramedics and use real defibrillators without the risk of injury. The latest paramedical equipment is used to consolidate students' theoretical knowledge by hands on practical learning.

The rooms are supplemented by 2 real working ambulances that can be driven into the under croft below building 21, which all Paramedical Science students will be given access to. Every emergency department across the country have different equipment and the suite has most of them available for student use.

A rescue vehicle and rescue manikins has recently been obtained to enhance student learning in emergency situations.

Working with ECU's Health Simulation Centre, paramedical students receive enhanced clinical learning practices through simulation-based resources. Students also have access to the rooms that replicate a home environment in Occupational Therapy.



Using a state of the art manikin and defibrillator which is the same as that used by Paramedics in an emergency situation



Students learn the specific techniques to safely cannulate a patient in an emergency situation. Before performing this on a live person (as illustrated) students practice extensively on dummy arms.



Students learning the techniques to manoeuvre a patient safely into one of the fully equipped ambulances that the students have access to on campus.

Occupational & Environmental Health – Room 19.225

ECU is fortunate to have a fully equipped occupational hygiene laboratory that allows for the monitoring for a wide range of hazards including chemicals, dusts, noise, thermal stress, light, ventilation assessment and biological hazards. The broad range of equipment allows students and researchers to investigate a number of different hazards in a range of industries. The equipment is calibrated to NATA accreditation standards and methods of using this equipment are approved. Students gain hands-on experience in practical skills in operating equipment that can assess hazards that may impact on the health and safety of workers.



A ventilation rig and a non-ionising radiation meter are being demonstrated ready for analysis

