

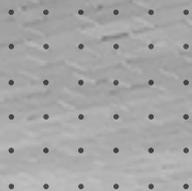


**ashoka**  
UNIVERSITY



**RESEARCH  
SCAPE**

**ASHOKA UNIVERSITY'S RESEARCH INFRASTRUCTURE  
2022-23**



# **ResearchScape**

## **Volume 1**

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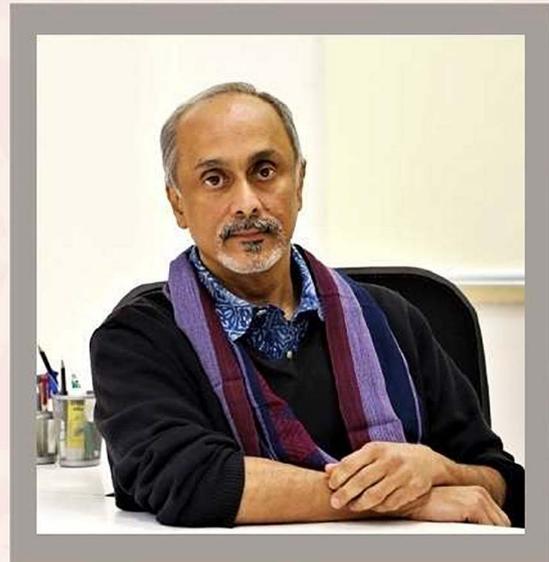
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## LETTER FROM DEAN, RESEARCH

“

For Ashoka's research to be counted among the best in the world, we must ensure that our research infrastructure is best-in-class and remains so, and that we are responsive to the needs of our researchers, as these needs evolve. Our Research Department Office is committed to this path.

”



Ashoka is a research university, dedicated to excellence and innovation. The Research and Development Office is committed to providing the right environment for research, ensuring that cutting edge tools and equipment are available to all Ashoka members, including faculty, staff and students. At Ashoka high-end equipment is not confined to the use of a single group or department, but is made available as common facilities, also facilitating interactions across departments. Where possible, we help our members make use of equipment that other nearby institutions may already have, using our formal agreements with them to avoid duplicating facilities. CSR funding, from important donors such as the AXIS Bank, provides us means for targeting funds to research that could have transformative societal impacts, as well as the ability to provide seed support for the development of novel ideas and interdisciplinary collaborations.

The Library is a common resource that is at the centre of our campus. Attractively laid out and with state-of-the-art kiosks, rare book collections, archives, as well as electronic support and security measures, it provides a comfortable academic space for all at Ashoka. Individual departments such as Economics and English need statistical software as well as software that supports the study of the digital humanities - the Research Department Office is responsive to these requirements. The sciences require expensive equipment such as high-end imaging instruments and telescopes. They also require equipment that needs constant maintenance and attention, such as insect and fish facilities. Negotiating their purchase and ensuring their maintenance is an important function of the Research Department Office.

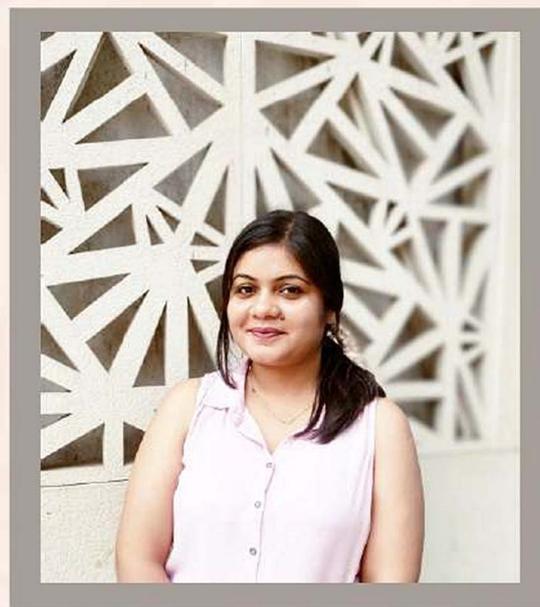
**PROF. GAUTAM I. MENON**  
DEAN, RESEARCH  
ASHOKA UNIVERSITY

# RESEARCH INFRASTRUCTURE AT ASHOKA

Research infrastructure refers to the facilities, sources, systems and services needed to conduct research, whether in the field of social sciences, humanities, or sciences. To promote research and innovation, Ashoka University must provide its research community with tools, resources, and capabilities that enable it to focus its research enterprise on its frontiers.

The Research Infrastructure management vertical was started in 2019 with a vision to provide a broad based architecture to bring researchers from different disciplines under a common roof. This would enable breaking disciplinary silos. This support would also enable them to be full partners in the global community of researchers. Ashoka University prioritises both sustainability and open access.

Additionally, the Research Infrastructure management vertical helps to support advanced research. Interdisciplinary research at Ashoka bridges disciplines, opening up novel possibilities for exploration and collaboration. This infrastructure will aid Ashoka's aim to develop a strong base of scientific and technological activity. This will support the economic and social activities that will power national development.



**DR. HEMANSI**  
MANAGER, RESEARCH AND DEVELOPMENT OFFICE  
ASHOKA UNIVERSITY

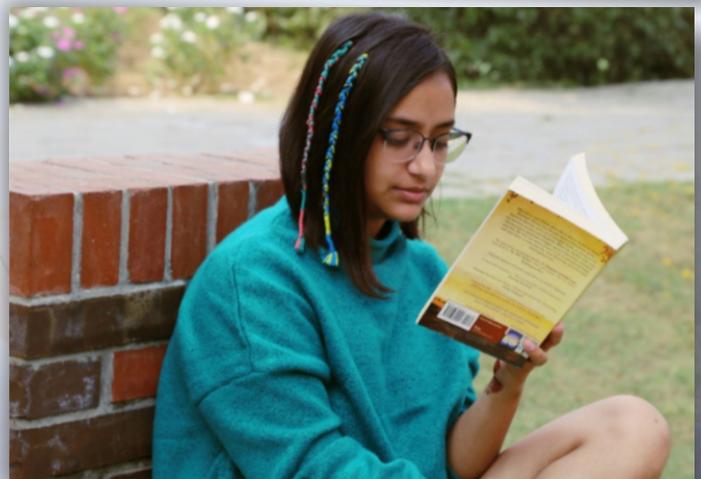


# SOCIAL SCIENCE AND HUMANITIES

## ECONOMICS

The Department of Economics at Ashoka University has a broad range of research interests. These include economic theory, game theory, behavioural economics, experimental economics, theoretical and empirical macroeconomics, monetary economics, economic growth, development economics, time-series econometrics and different areas of applied microeconomics and financial economics.

The department runs computer experiments and analysis using Ashoka's computational systems and high end servers. Software such as State, Matlab, Zoho, Survey Monkey for data analysis are used routinely for data analysis and surveys.





# ENGLISH

The Department of English consists of faculty members from around the globe with expertise in the areas of Literary Theory, Classics, Medieval and Renaissance Literature, British Literature through the ages, Indian literatures, and Digital Humanities. As far as the research infrastructure is concerned, the department nurtures a relationship with digital affordances that prioritises sustainability and open-access. The ability of students to navigate these free or premium products makes them more agile to respond to a rapidly changing technological landscape.



The following are the not-for-profit software used in Digital Humanities classes:.

### Geographic Information Systems

Computer system that analyzes and displays geographically referenced information

- > Quantum GIS (QGIS)
- > MapBox
- > Leaflet

### Data Visualization

- > Plotly
- > ggplot

### Version Control- Code Sharing

- > GitHub

### Wire Framing / ux Design

- > Balsamiq

### Coding IDEs

- > Rstudio
- > Oxygen XML Editor
- > Atom (deprecated)
- > Visual Studio

### Programming Languages

- > R
- > HTML
- > SQL
- > Python
- > CSS
- > Java Studio

### Relational Database Management Systems

- > Drupal
- > Heurist

### Content Management And Digital Exhibition Systems

- > Omeka





# PSYCHOLOGY

The core vision for the psychology lab at Ashoka is to study a range of nonverbal bodily metrics from individuals as they perform tasks and respond to stimuli.

## Eye tracker system

The system measures eye position, eye movement, and pupil size to detect zones in which the user has a particular interest at a specific time. The connection between what one looks at and what's going on in one's mind makes it possible to derive behavioural insights from eye movements. Eye tracking systems enables researchers to generate accurate insights about cognitive processes, visual attention, and reactions.



## Peltier tiles

These are being used to put together a spatial learning apparatus to better understand the relationship between sleep and plasticity.



## Red and green LEDs:

These are for optogenetic activation and inhibition of neural circuits in the fly.



## Sleep Deprivation Apparatus

A custom built apparatus for *Drosophila*: SNAP - or Sleep Nullifying Apparatus.



Z O H O

Zoho subscription

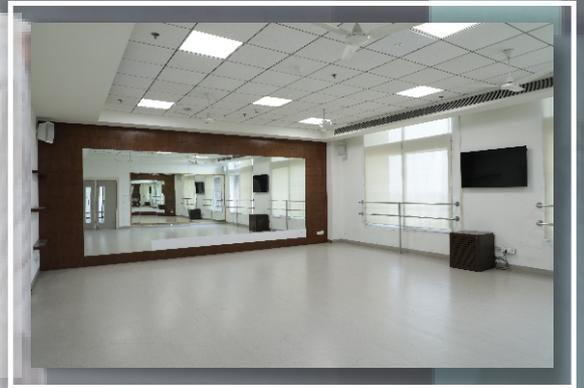




# VISUAL AND PERFORMING ARTS

## DANCE STUDIO

Key features include a movement-friendly floor, bars for exercise, full-length mirrors on two walls, three separate green rooms, a video screen, and sound system



## BLACK BOX THEATRE

The black box theatre is an innovative performance space with multiple, multi-directional seating possibilities. Among its facilities are benches, chairs, cushions, performance-appropriate lighting system and performance-appropriate sound systems.

The facility has 2 Ceiling Speakers, 4 Box type and 3 way speakers, 4 Subwoofers, 2 **Bose** Amplifiers, 6 wireless Microphones, 3 wired microphones, 2 each Antenna set, splitter and combiner from **BeyerDynamic**, a few sound Boxes and digital moulded cables from **Kramer**, and 1 **Sony** Blu ray Player.



# MEDIA STUDIES

The media studies department at Ashoka University is designed to provide students with a comprehensive understanding of media and communication in today's globalised world. The department aims to equip students with critical thinking, analytical skills, and practical knowledge required to navigate the rapidly evolving media landscape. Students are encouraged to produce different forms of media products for instance articles, film shorts, photo essays, web stories and qualitative research projects assessing media effects on society.

The university provides access to modern media labs, production equipment, and editing suites to support students' creative and academic pursuits. The media lab has production and post-production equipment, Production Facilities Broadcast HD Cameras, DSLR Cameras, Live Production Control Room, Teleprompter, Lighting, Sound equipment, 3-axis mobile gimble camera stabilizers, Camera sliders for pans and time-lapse, Post-Production Facilities, Apple Desktops with the latest versions of Adobe Creative, Cloud Database of stock music.





# HDFC LIBRARY

*The library at Ashoka is one of the most sought-after places to study, relax, research, rejuvenate, and collaborate. The following are some of the key features of Ashoka's world-class library*

- Well-appointed space in AC 04 building, with a floor area of 60,000 sq. ft spread across two floors.
- Best-in-class interiors with acoustics, designer lights, carpeted floors, colour zones and variety of seating options to enhance user experience.
- Complemented with Shanghvi library in AC 01 building for reading & reference purposes.
- 530 seats and holding capacity of 1.2 lac documents.
- Self-check-in / check-out kiosks to enable students to issue/return documents on their own.
- Touch screen kiosks for searching catalogues & borrowing data.
- Exclusive sections for reference books, personal collections, Bhasha (vernacular) books, and books by Ashoka faculty.
- RFID / EM-powered hybrid gates for better security & control.
- Designated places for digital curation, research support, database training, and multimedia reference.
- Rare & classic books collection on Shelley & Keats.
- Exclusive research carrels for Ph.D. scholars.
- Conference rooms & group study rooms for meetings & collaborations.
- Scope for user-oriented activities including book exhibitions, author talks and literary events.

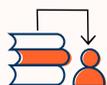
## SERVICES



Remote access to e-resources



Access to '1947 Partition' archives



Document reference and borrowing



Articles and news clippings service



Institutional repositories



Digital curation



Interlibrary loans



Research support including novelty check and referencemanagement software



## RESOURCES

- Print Books: 62000 including 21000 valuable & classic books received through personal donations.
- Print Magazines + Newspapers: 28+6
- e-Books: 3.9 Lacs
- e-Magazines: 12

- e-Journals: 15895
- e-Reference Sources/e-Archives: 07
- e-International Newspapers: 03
- Audio / Visual / Documentary: 270 +

## IT TOOLS & SUPPORT



QR-based system for new library user registration



KOHA system for library management & housekeeping



J-gate, a journal article discovery system with access to 50,000 journals, across disciplines



D space software for institutional repository & content management



Remote-XS platform for enabling remote access to most of the e-resources



Turnitin & Ouriginal platforms for checking plagiarism

## MEMBERSHIPS & COLLABORATIONS

- Partner, DELNET (Resource sharing platform)
- Member, SLA (Special Libraries Association), USA.
- Member, INFLIBNET (UGC / MoE/ GoI).
- Member, Daisy Forum of India.
- Dissemination centre for "1947 Partition Archives"(an oral history project supported by Stanford Libraries Network).



# SCIENCES

## ADVANCED IMAGING FACILITY

The Ashoka Imaging Facility supports the diverse microscopy needs of the Ashoka's scientific community through a variety of microscopes. Currently the facility houses the following instruments:

### Olympus BX63 Upright epi-fluorescence

The Olympus BX63 Upright epi-fluorescence is a powerful and reliable microscope that offers a range of features to help researchers. It features the latest in optics technology, such as high-resolution objectives, advanced illumination systems and automated functions for easy operation. In addition, the Olympus BX63 Upright epi-fluorescence includes several novel features that make it an ideal choice for researchers looking for precise results. These include a motorised stage with precise movements, LED lighting with adjustable intensity and wavelength selection, as well as automated image capture with real-time image processing capabilities.



OLYMPUS BX63

### FemtoJet Microinjector on Olympus IX53 inverted microscope

The FemtoJet Microinjector is a revolutionary new feature of the Olympus IX53 inverted microscope, allowing researchers to achieve precise and accurate microinjections into cells. The FemtoJet Microinjector features a unique design that allows for high-precision injections with minimal sample waste. With its innovative design, it can inject volumes as low as 0.5 nanoliters with an accuracy of +/- 5%. It also has a built-in pressure control system that ensures the correct injection pressure for each injection. This allows for greater control over the injection process and reduces the risk of damaging fragile samples.

Additionally, it is equipped with an integrated imaging system which allows researchers to monitor their injections in real-time. The FemtoJet Microinjector is an invaluable tool for the cell biology research group at Ashoka who that requires high precision and accuracy in their microinjection experiments.

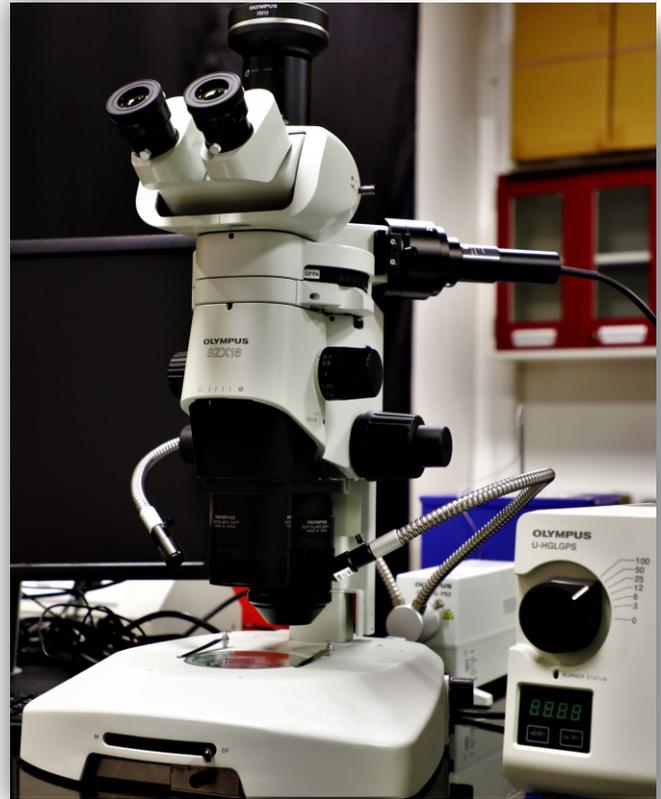


OLYMPUS LX53

## Olympus SZX16 stereo-zoom epi fluorescence microscope

The Olympus SZX16 stereo-zoom epi fluorescence microscope is a highly advanced microscope that is designed to provide exceptional versatility in imaging and produce high-quality images and gain important insights into the structure and function of cells, tissues, and organs. It is particularly well-suited to fluorescence imaging applications.

One of the key features of the Olympus SZX16 is its large field of view, which makes it an excellent choice for observing large specimens or samples. Additionally, the microscope is equipped with advanced optics that allow for high-resolution imaging, enabling researchers to capture detailed images of even the smallest structures. The Olympus SZX16 is widely used in research, including cell biology, developmental biology, genetics etc. It is particularly useful for studying the structure and function of cells and tissues, including the localization of specific proteins and the dynamics of cellular processes.



**OLYMPUS SZX16**

## Leica Fluorescent Polarizing microscope DM4P

The Leica polarizing microscope is a high-quality research-grade microscope that is designed for all polarizing examinations. This microscope is equipped with strain-free optics to ensure that the observed birefringence results from the sample and not from the optics. The equipment is ideal for a wide range of applications such as to detect the presence of inclusions, such as crystals, fibres, or bubbles, in a sample. In a soft matter lab, the Leica polarizing microscope is a

highly beneficial instrument due to its ability to detect even the slightest variations in a material's properties. By analysing the optical characteristics of a sample, the researchers may obtain valuable information regarding the material's structure and composition and may develop new materials or make improvements to existing ones.

Fluorescent Polarizing microscope

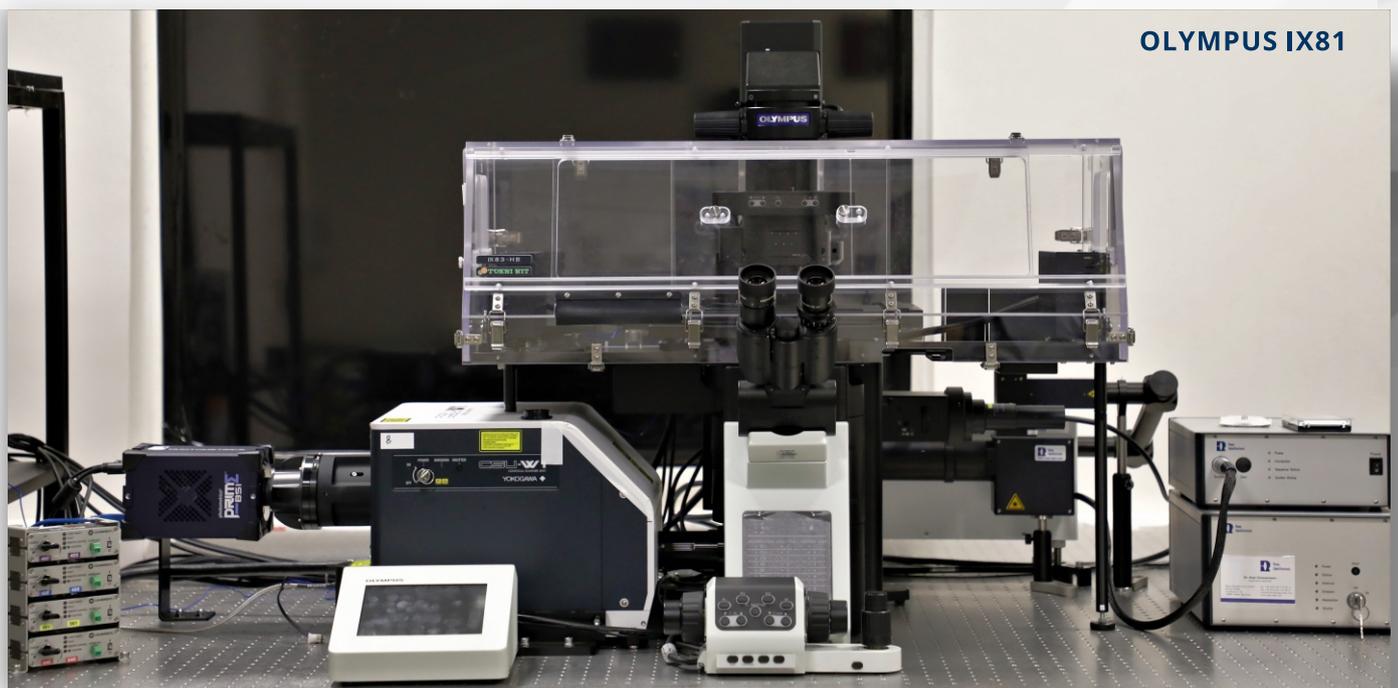


## Olympus IX81 with W1 Spinning Disc confocal Microscope

The Olympus IX81 with W1 Spinning Disc confocal microscope is a powerful imaging system used in the field of microscopy and biological research at Ashoka. It combines spinning disc confocal technology for fast imaging and improved optical sectioning. It provides high-resolution imaging of cellular structures, offers optimized live cell imaging with reduced phototoxicity, and allows for versatile configurations to meet specific research needs, including multi-dimensional imaging and extended experimental capabilities.

The researchers at Ashoka leverage this Spinning Disc confocal microscope for various applications. In cell biology, it enables visualization of cellular structures, molecular interactions, and processes like cell division, organelle dynamics, and signal transduction. For developmental biology, it tracks cell movements, captures dynamic events during embryogenesis, and investigates tissue and organ development. It can also visualize the effects of drugs on cellular structures and functions, evaluating their efficacy and mechanisms of action. It facilitates studies on protein dynamics, molecular interactions, and cellular signaling pathways using techniques like FRET and co-localization analysis.

Additionally, the department is also equipped with multiple dissection scopes for *Drosophila* and *C. elegans* manipulation



## **BEHAVIOURAL BIOLOGY FACILITY**

The fish facility is used by the researchers to facilitate the use of fish as a model organism for any kind of research, along with the daily care of the animals and aquarium systems. Currently, this involves a large fish housing system with automated cleaning, temperature monitoring, and pH and salinity maintenance. The fish are kept on a 14:10 light:dark cycle and are fed brine shrimp culture once a day. The facility is equipped with huge fish tanks and an electrochemical analysis set up.



## **CLEAN ROOMS**

A "clean room" is a laboratory environment that ensures that airborne particles are maintained at very low concentrations. This room is isolated, actively cleansed, and prevented from contamination by a range of particles and biological material, including dust, airborne organisms, and vaporised particles. The department has 2 clean rooms with 4 Biosafety Type II A2 class cabinets installed within these rooms. To maintain the clean environment inside the labs, the entrance has HEPA filters and a proper air monitoring system.



# INSECT FACILITY

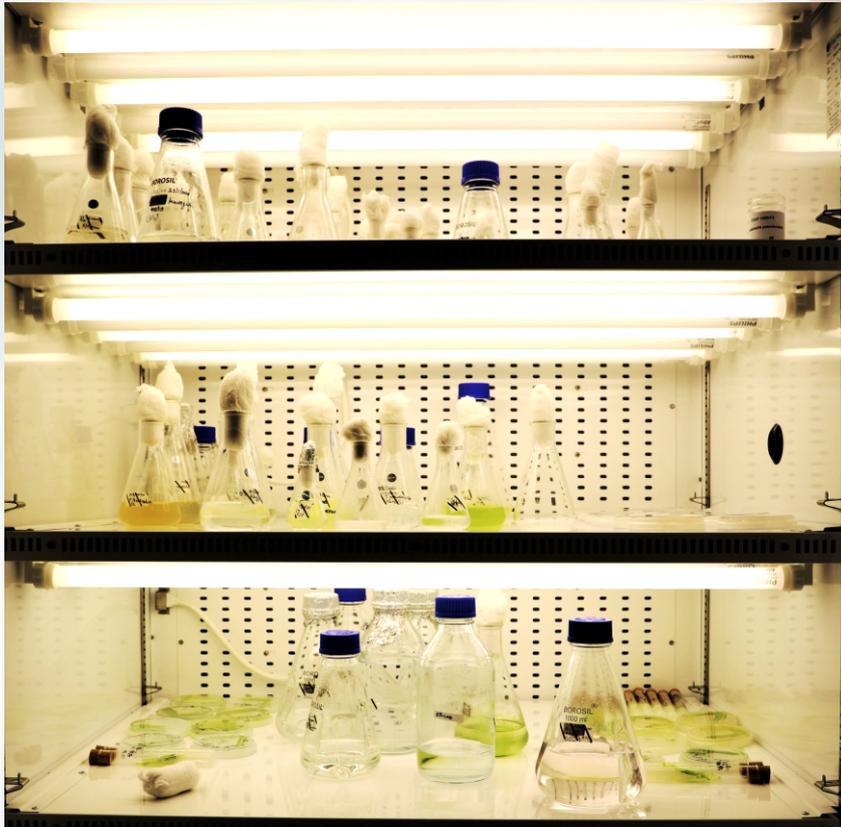
A *Drosophila* insect facility is a specialised laboratory used for the cultivation and study of the fruit fly, *Drosophila melanogaster*. These insects are widely used in genetic research due to their short lifespan, ease of breeding, and clear genetic markers. The facility typically includes specialised equipment such as:

- growth chambers,
- microscope stations for sorting and typing insects,
- piped CO<sub>2</sub> plate anaesthesia, dissection,
- electrophysiology rigs,
- fly food preparation room.

Researchers within the facility use *Drosophila* to study a range of genetic and biological phenomena, including gene expression, neural development, and behaviour. The facility is typically maintained by a group of researchers who work together and laboratory managers to ensure the health and well-being of the flies, and the accuracy of the research conducted on them.



# PLANT RESEARCH FACILITY



A plant research facility is used for studying plant growth, development, and genetics. These facilities are equipped with specialised tools and equipment to allow researchers to control and manipulate the growing conditions of plants. They also use advanced technology and techniques such as genetic engineering, molecular biology, and high-throughput sequencing to study plant biology.

The facility at Ashoka includes an environmentally controlled greenhouse (fan and pad cooling system) and a shade house. It also houses an algal growth chamber with programmable light intensity up to  $330 \mu\text{moles m}^{-2} \text{s}^{-1}$ . Researchers within the facility use these resources to study a range of plant-related phenomena, including circadian rhythms, omics studies.



# PREPARATIVE INSTRUMENTATION FACILITY



## ← High-speed centrifuge



A high-speed centrifuge is used to separate substances of different densities in a liquid medium that operates on the principle of centrifugal force. The facility has a total of seven refrigerated centrifuges and two minispins. All the centrifuges are of Eppendorf make and their speed varies from 10-15000 rpm.

## Gel Documentation system →

The ChemiDoc MP Gel Documentation System incorporates various imaging capabilities, making it a powerful tool for capturing high-quality images and analyzing data. Some key features include Multimode Imaging, High Sensitivity, Automated Image Capture, Multiplexing Capabilities. The applications vary from visualization and documentation of protein samples separated on SDS-PAGE, western blot DNA and RNA samples on Agarose gel to analysis of chemiluminescent ELISA data, quantification of nucleic acid in gel based assays and detection of RGB and FR/NIR secondary antibodies with low fluorescence background.



## ← Spectrophotometer

Spectrophotometer is used to measure the absorbance or transmittance of light by a sample as a function of wavelength. The Cary 60 spectrophotometer, by Agilent Technologies, is a versatile and reliable instrument known for its high performance and ease of use. It has a wavelength range of 190–1100 nm and samples can be scanned in under three seconds. A few applications are Measurement of concentration or purity of substances, such as DNA, proteins, and pharmaceuticals, monitoring enzymatic reactions and other kinetic studies, characterization of materials, including polymers and nanomaterials, based on their absorbance properties.

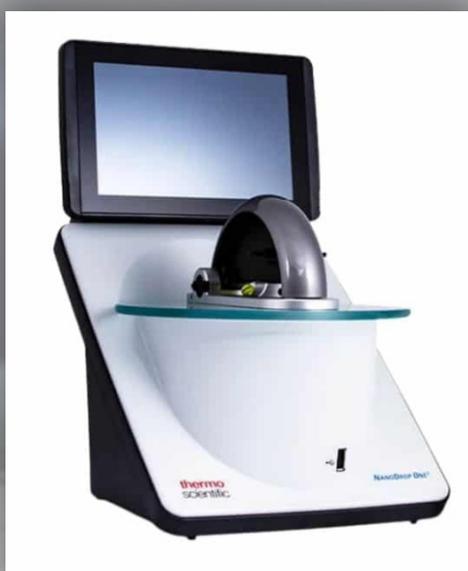


## ← PCR systems

PCR is a powerful molecular biology technique that allows the amplification of specific DNA segments or regions. It is widely used in various fields, including genetics, forensics, medical diagnostics, biotechnology, and research. It typically includes Thermal Cycler, Block or Sample Holder, Control Interface, Heated Lid. The facility has two thermal cyclers of BioRad make and one Proflex 3\*32 well PCR systems.

## Sonicator and Homogenizer →

Ultrasonic probe sonicators use high-frequency sound waves (ultrasonic waves) to disrupt and disperse samples, making them an essential tool in many scientific experiments. This is a powerful instrument used for various applications such as cell disruption, homogenization, emulsification, dispersion, and nanoparticle synthesis. The Qsonica Ultra-sonic probe sonicator can be programmed to sonicate at 50% amplitude for 5 minutes, shut off for 2 minutes and re-start at 25% amplitude for 10 minutes.



## ← Nanodrop Thermo Fisher

The NanoDrop spectrophotometers are designed to measure sample volumes in microliter range, making them suitable for analyzing precious and limited samples. The sample is placed directly onto an optical measurement surface, and the instrument measures the absorbance of light passing through the sample. The NanoDrop spectrophotometers by Thermo Fisher Scientific, are compact and easy-to-use instruments used for nucleic acid and protein quantification and purity analysis. These can easily detect High concentrated samples (upto dsDNA at 27,500 ng/ $\mu$ L) without dilution.



# ANALYTICAL EQUIPMENT FACILITY

## Single-molecule Covalent magnetic Tweezers

Single-molecule covalent magnetic tweezers (SMT) are a cutting-edge technology used in biophysics and molecular biology to study the mechanical properties of individual molecules. This technology works by using magnetic fields to manipulate the position of a single molecule that has been covalently attached to magnetic beads. This allows researchers to apply precise forces to the molecule and measure its mechanical response.

SMT has been used to study the mechanical properties of a variety of biological molecules, including DNA, RNA, and proteins. This technology has also been used to study the interactions between these molecules, as well as their interactions with drugs and other small molecules. SMT is a powerful tool for understanding the fundamental properties of biological molecules and has the potential to lead to a better understanding of a range of biological processes.

At Ashoka, magnetic tweezers are used together with a confocal microscope to observe the manipulated individual molecules in real time. The group currently uses magnetic tweezers to study the mechanical properties of DNA and proteins



## Real-Time PCR (Quantstudio 5)

Real-Time PCR (Quantstudio 5) is a powerful tool used to detect and quantify nucleic acid sequences in a sample. It is an important technique in molecular biology, and it can be used for a wide range of applications, from diagnostics to research.

QuantStudio 5 Real-Time PCR technology offers continuous DNA monitoring during PCR, enabling precise measurement of nucleic acid levels.

It allows multi-color detection for simultaneous analysis of multiple targets, with interchangeable block modules for flexible sample handling. The system offers high sensitivity, user-friendly software, and data connectivity for result analysis and management. It provides precise temperature control, gradient PCR for annealing optimization, and sample verification options for enhanced research and diagnostics in molecular biology.



## ***Plate reader (Clariostar)***

Plate reader (Clariostar) is a device that can read and analyse biological samples. It is used to measure the amount of biological material present in a sample, such as proteins, enzymes, nucleic acids, and other molecular components. It can also be used to detect changes in the sample over time. Plate reader technology has revolutionised the way researchers conduct experiments by allowing them to quickly and accurately measure the amount of biological material present in a sample. The plate reader technology has been used in many fields such as biochemistry, genetics, immunology, microbiology, and cell biology. This technology has enabled researchers to gain new insights into how cells interact with each other and how diseases develop.



## ***Fast Protein Liquid Chromatography (FPLC), GE Healthcare***



Fast Protein Liquid Chromatography (FPLC) is a powerful technique used in bioseparations. It is an analytical tool used to separate, identify, and quantify components of a protein mixture. The use of FPLC allows for the separation of proteins in a short amount of time with minimal sample preparation. It can be used to separate, purify, and analyse proteins in a range of different formats. FPLC also has the ability to detect small differences between proteins, making it ideal for use in biotechnology research. Additionally, it is possible to use FPLC to detect post-translational modifications on proteins, which can provide valuable insights into their structure and function.

## ***Flow Cytometer, BD LSR Fortessa X-20,***

The BD LSRFortessa™ System is a revolutionary technology that enables scientists and researchers to quickly and accurately analyse complex biological samples. This system combines the power of flow cytometry with the convenience of automated sample preparation, allowing for faster and more accurate results. With its intuitive user interface, users can easily set up experiments, monitor progress in real-time, and access data from anywhere in the world. The system also offers advanced features such as data analysis tools, cell sorting capabilities, and comprehensive reporting capabilities. With its robust design and reliable performance, the BD LSRFortessa™ System is an ideal solution for any laboratory looking to streamline their work-flow and improve their research outcomes.



## ***Bioanalyzer 2100,***

***(Agilent Technologies India Pvt Ltd)***

Agilent Technologies India Pvt Ltd's Bioanalyzer 2100 is a sophisticated instrument that enables scientists to quickly and accurately analyse the size, concentration, and purity of DNA, RNA, proteins, and cells. It offers powerful features such as high-resolution separation of samples on a capillary electrophoresis (CE) system, automated sample preparation and analysis with minimal user intervention. With its intuitive software interface, the Bioanalyzer 2100 gives researchers the capability to analyse complex biological samples in real time. The instrument is widely used in research labs for applications such as gene expression analysis, genotyping studies and quality control of recombinant proteins



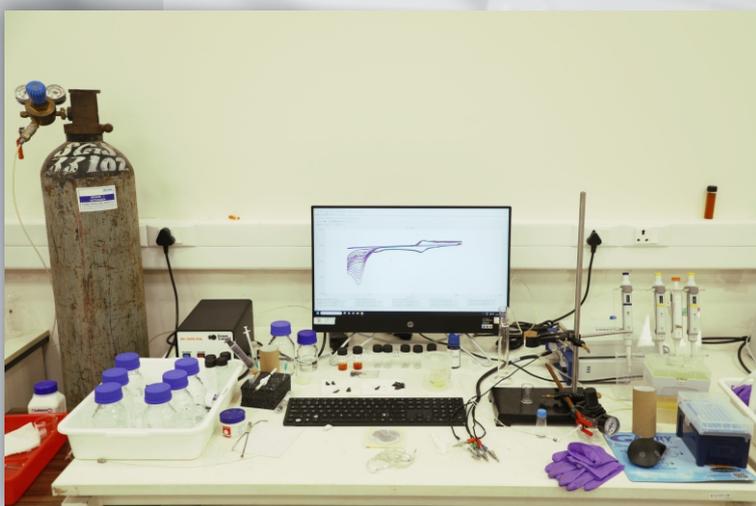
## ***Fume hoods***

Fume hoods are safety devices used in laboratories to protect workers from hazardous fumes and vapours/vapors. They provide a safe environment for scientists to conduct experiments and research without the risk of inhaling dangerous chemicals. Fume hoods are designed to create an airtight enclosure that traps hazardous fumes and vapours/vapors within the hood, preventing them from escaping into the laboratory or surrounding environment. They also provide adequate ventilation to ensure that workers remain safe while working with hazardous materials.



## ***Potentiostat /Galvanostat Electrochemical Instrument,***

A Potentiostat regulates the voltage difference between two electrodes, working electrode and reference electrode in an electrochemical cell. There is a third electrode, auxiliary or counter electrode through which potentiostat controls the current. It measures the current flow between the Working and Counter electrodes. The department has Potentiostat/galvanostat Autolab Metrohm PGSTAT 204 N with a compliance voltage of 20 V and a bandwidth of 1 MHz, a maximum current of 400 mA or 10 A in combination with the BOOSTER 10A. Analog and digital inputs/outputs are available to control



Autolab accessories and external devices are available. The PGSTAT204 includes a built-in analog integrator. Few of the applications of the equipment are electrocatalyst material testing, battery testing, detection of intermediates via collection and shielding experiments (RRDE), and study of kinetics.

## ***Fourier-transform Infrared Spectroscopy***

### ***Agilent Cary 630***



FTIR spectroscopy, is an analytical technique generally use to identify organic, polymeric, and inorganic materials. The Agilent Cary 630 FTIR in the chemistry laboratory measures liquid and solid samples. It is a flexible benchtop FTIR instrument offering high performance and extraordinary ease-of-use in an ultra-compact design. Its modularity offers sampling flexibility for analysis of solids, liquids, powders, and gases. Permanently aligned optics allow a wide range of modules to be swapped in and out in seconds, providing superior quantitative and qualitative information – fast.

### **Special Features**



The field-proven, robust optomechanical system offers outstanding performance and reproducibility, even in humid and tropical environments



Rapidly gain qualitative and quantitative information – Identify unknown substances and determine levels of sample constituents



Be flexible and react to changing analytical needs – The uniquely versatile modular concept allows the Cary 630 FTIR spectrometer to be reconfigured with precisely optimised sample modules within seconds, allowing users to master the diversity of real-world application challenges



## Gas Chromatograph (GC) System



The 8860 Gas Chromatograph (GC) System sets the standard for routine GC analysis with reliability and robustness. Configurable with up to two inlets, three valves, and three detectors, including a single quadrupole mass spectrometer, the 8860 GC addresses a wide range of routine gas chromatography application areas.



### Special Features



Advanced instrumental intelligence functionality for GC diagnostics



Colour touch screen display provides access to GC set point and status information, configuration, and signal plot to confirm that analyses are progressing as intended.



Have ambient temperature and pressure compensation for more stable retention times and detector baselines.



Single-filament thermal conductivity detector (TCD) does not require a separate reference gas or manual potentiometer adjustment, and provides a stable baseline without drift.



Autoranging flame ionisation detector (FID) provides a wide dynamic response range, enhances accuracy, and minimises preparation requirements for samples that contain very high or very low compound concentrations.

## ***GLOVEBOX Systemtechnik GmbH***

### ***Glovebox MEGA 2***

GS Glovebox is renowned for its expertise in manufacturing high-quality glovebox systems. The Department of Chemistry owns the model MEGA 2. The MEGA 2 is a large-scale glovebox system designed to provide a highly controlled and isolated working environment. It features a spacious interior that allows for comfortable operation and handling of materials while maintaining strict control over atmospheric conditions. It is equipped with advanced features and components to ensure precise control of parameters such as temperature, humidity, and gas composition. It typically includes airtight glove ports, an integrated gas purification system, and a control panel for easy monitoring and adjustment of environmental settings. The system also includes a GS solvent adsorber and a freezer integrated into the side panel of the glove box.

The MEGA 2 glovebox system is suitable for a range of applications, including controlled environment experiments with sensitive or reactive substances, to run inert conditions reactions, in synthesis and characterization of new materials by keeping the purity of the compound and catalyst Preparation.



## ***Soft Matter and Fluid Dynamics Labs***

Soft matter lab is a state-of-the-art interdisciplinary research facility to carry out research work in non-equilibrium complex systems such as liquid crystals, electrolytes, and living organisms. We are building a homemade setup for large-scale flow experiments in Non-Newtonian fluids. More information about the research activity of this lab is available on the departmental web page.

**Some of the important equipment available in the lab are listed below.**

- Polarized light microscope with all accessories (Leica DM4P)
- Stereo zoom microscope (Olympus SZX7)
- Precision LCR meter, 20Hz to 2 MHz (Keysight E4980A)
- Lock-in amplifier (SRS Systems, SR830 DSP)
- High voltage linear amplifier (FLCE A800DI)
- Mixed Domain Oscilloscope (Tektronix Model MDO34 3-BW-200)
- Programmable multimeters (6.5digit Keithley DMM6500)
- Programmable precision balance (Ohaus AX8201/E)
- Optical Bench (TMC 784-675-12R)



### ***Zeeman effect apparatus***

***(Holmarc; HO-ED-S-04A)***

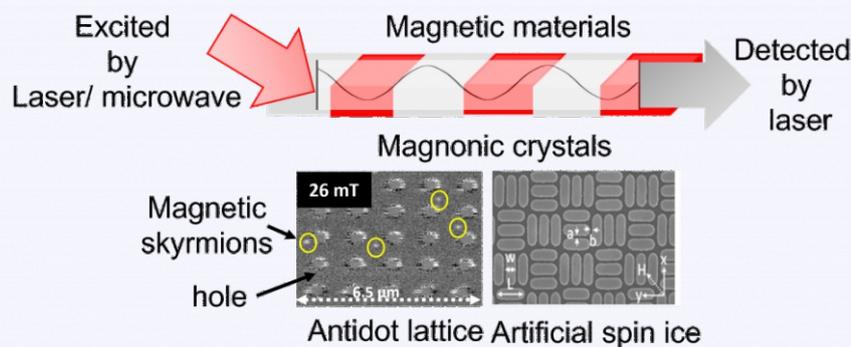
This apparatus of Holmarc's is designed for the verification of the Bohr magneton and the fundamental constant  $hc$ . It demonstrates the quantum nature of light and behavior of electrons. The setup includes a mercury lamp, an electromagnet with constant current power supply, a Gauss and Tesla meter, a Fabry-Perot etalon, a IR filter, a green light filter, a polarizer with variable aperture, a Zoom lens assembly with a CCD camera that can be directly interfaced with the PC to monitor the fringe patterns and to save the desired images of the interference pattern.



# Magnetic Characterization Lab

A recent addition to the experimental physics infrastructure is the complex magnetization characterization lab. In general, the magnetization dynamics could be studied from femto to nanosecond time scale.

To characterise the magnetic materials, it is important to study these magnetic properties such as hysteresis curve, saturation magnetization, coercivity etc. The Physics laboratory has a static Magneto-optical Kerr effect (MOKE) microscope set-up to study the magnetic properties. The linearly polarised light is converted to an elliptically polarised light when the light is reflected from a magnetic material. This phenomenon is known as the Kerr effect and the corresponding rotation in the plane of polarisation is called the Kerr rotation. The magneto-optic rotation is proportional to the first order of magnetization. It is a very sensitive but simple technique to study the magnetization reversal or magnetic hysteresis loop from continuous and patterned magnetic films.



## The set up consists of:

► PC-controlled electromagnet

► MOKE source and Detector arm with the following items:

- A Continuous laser of wavelength 405 nm, 532 nm, and 655 nm with output power of 5 mW
- Polarizer with a Glan–Thompson prism for both Polarizer and Analyser with High Extinction Ratio of 100,000:1
- Motorized High Precision Analyzer Unit – Servo motor Based – 0.0018 Degree Encoder Resolution
- Magneto-Optic Modulator MR3-2– Faraday 400HZ
- Lock-in amplifier
- Sample holder with XYZ translation for the measurement in Polar, Longitudinal, and transverse geometry
- Si Photodiode detector unit
- Measurement controller electronics (including Digital Filter Unit)
- Software - Spectra FR/KR V2.2

Currently, the department of Physics is offering two astronomy courses and consist of the following equipment;

## **Theodolite**

The department has 3 theodolites which are part of our astronomy lab and are used to estimate the dimensions of distant objects.

## **SBIG STC-7 camera**

The SBIG STC-7 is a high performance astronomical imaging application tool with an ultra-sensitive and low noise 7.1 MP cooled CMOS sensor, integrated 8-position filter wheel, plus a complete set of LRGB and narrowband filters, including an opaque filter for convenience in taking dark frames.

## **GSO-Optics 8" Newtonian Reflector Telescope**

This is a true all-rounder telescope and offers best prerequisites for lunar and planetary observations. It has a focal length of 1000 mm and a photographic speed of f/5. It comes with an equatorial mount and a 200 mm primary mirror with 94% reflectivity. We currently use 25 mm and 9 mm eyepiece lenses for observation. The eyepiece mount also doubles as a DSLR camera holder for astrophotography. The telescope has been named as Zoom and a part of the student's astro club for the past 5 years.



## **Celestron NexStar 8SE Telescope**

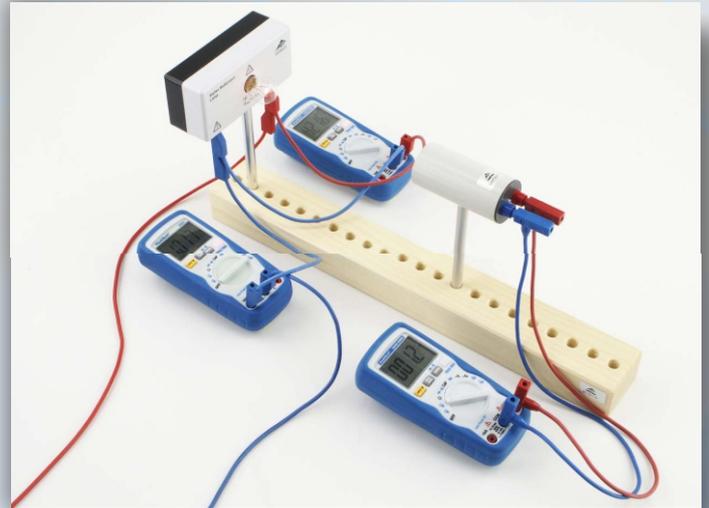
The Celestron 8SE telescope is one of the classic telescopes in the market. Its large, 8-inch aperture with excellent light-gathering ability provides spectacular views of the Moon and planets, along with deep sky objects like the Whirlpool Galaxy and Hercules Globular Cluster. Fully automated mount with a database of 40,000+ celestial objects, locates and tracks objects automatically. This telescope is updated with all the latest features to provide the best stargazing experience and is a part of our Astronomy laboratory. It is accompanied by a package of accessories like a 25mm eyepiece, a star diagonal, a star pointer finderscope, adjustable steel tripod, the Sky Level 1 Astronomy software, NexRemote telescope control software, a Celestron barlow lens with T-adaptor (model no. 93640), and a Celestron AstroMaster Eyepiece Kit (model no. 94307).



## ***Stefan Boltzmann setup***

***(3B Germany)***

This set up consists of a Stefan Boltzmann lamp, DC power supply 20 V, 5 A (230 V, 50/60 Hz), a Moll-type thermopile, digital multimeter P1035, barrel foot of 1Kg, set of 15 safety experiment leads. In this experiment, the thermopile is used to make a relative measurement of the intensity of radiation from the lamp source, as a function of temperature, to verify the Stefan Boltzmann law which describes the way the intensity of radiation from a black body depends on temperature.



## ***Mathematica 5 Users Perpetual Network licence***

Mathematica is the most widely used system for doing mathematical calculations by computer, including symbolic and numeric calculations and graphics.

### **Features of Mathematica;**

- Elementary mathematical function library.
- Special mathematical function library.
- Linear and non-linear Control systems libraries.
- Number theory function library.
- Support for complex number, arbitrary precision, interval arithmetic and symbolic computation
- Matrix and data manipulation tools including support for sparse arrays.
- Numeric and symbolic tools for discrete and continuous calculus
- Tools for visualising and analysing directed and undirected graphs.
- 2D and 3D data, function and geo visualisation and animation tools.
- Group theory and symbolic tensor functions.
- Continuous and discrete integral transforms.



# CENTRE FOR SOCIAL AND BEHAVIOUR CHANGE (CSBC)

The research team at CSBC designs, executes, and analyzes empirical studies to understand human behavior, particularly in low-resource settings. They use the same measurement techniques and analytical methods across projects, bringing the same rigorous approach to uncovering new hypotheses for behavior change, improving behavioral decision-making models, or testing the impact of a behaviourally-informed policy intervention in the field.



## Eye Tracking Software

CSBC uses eye-tracking technology for measuring gaze patterns which allows to evaluate how information is being processed and encoded. Also, allows to model various factors that are a part of real-world decision-making. Attention, memory, reward, complexity, confidence, risk aversion, trust, and deception are a few of the constructs which are planned to study in the context of socio economic decisions.



## Pop-UP lab

CSBC's UP BIU team houses the Pop-UP lab — a mobile survey and experimental data collection team with portable tablets, smartphones, and recording devices for data collection in Uttar Pradesh. The Pop-UP lab team recruits subjects from all demographics in Uttar Pradesh and conducts high-quality data collection.



## Qualtrics Designxm And Corexm

CSBC has licenses for the cutting-edge survey, experimental, and experience management software, Qualtrics. Experiments designed with complex randomisation, a variety of questions and data types, and various distribution channels, including an offline app, email, and SMS for conducting data collection.



## STATA

Software for data analysis and visualization.



## Surveycto

For offline data collection with enumerator agencies is conducted on SurveyCTO



## PHRP

All CSBC employees are trained in human subjects research and receive certificates from Protecting Human Research Participants (PHRP).



### Sona System

For managing pool of respondents, collects rich demographic data, and schedules study participation through SONA, which is a world renowned software.



### Culture Fair Scale 2 Test

The standard IQ test that doesn't depend on either culture or education. These include Raven's matrices in pen and paper format of varying difficulty levels.



### Microsoft Azure And Bitnami

Online experiments need synchronous interactions between participants are conducted through experiments based on a Bitnami stack that is run on Microsoft Azure cloud servers based in India.



### SurveyMonkey

CSBC has an enterprise subscription to SurveyMonkey for its survey data collection requirements.



## CENTRE FOR STUDIES IN GENDER AND SEXUALITY

It is the first Centre of its kind in India to study the broader spectrum of questions relating to both gender and sexuality. This spectrum includes issues of inequality, fantasy, pleasure, identity, and politics that are key realities of our everyday lives.

### Anti-sexual harassment Films and Posters

Recognizing a lack of effective training resources in India on the subject of sexual harassment that are specific to the university context, are relatable to students, and that retain the complexity of the issue. The center has developed a set of ten short training films written, directed and produced by Ashoka students, faculty, staff, and trainers affiliated with Ashoka. These can be used as a launch-pad for nuanced discussions on the subjects of sexual harassment, consent, sexism and other discriminatory behavior.

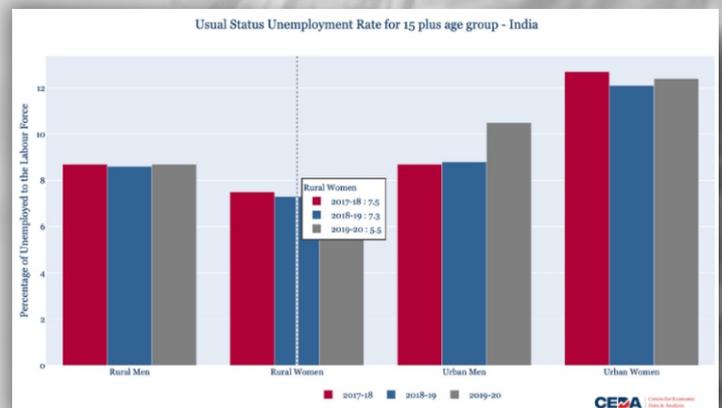
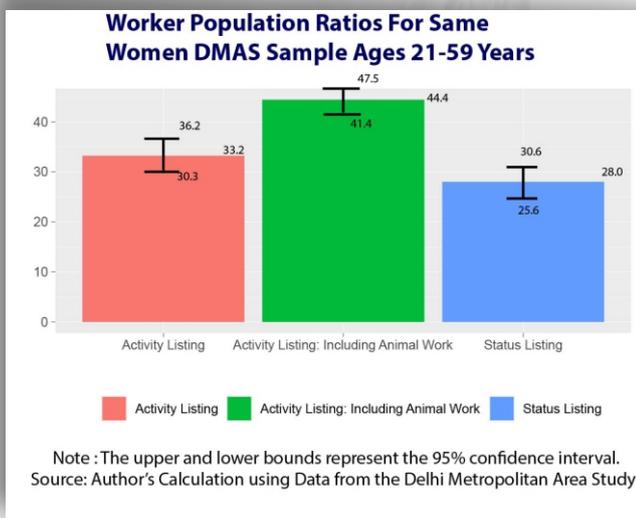
A series of posters that have been strategically put up across Ashoka University's campus. These posters talk about the many complications that arise from understanding consent through the lens of a "yes/no" binary, and instead provoke us to think about our everyday sexual encounters carefully.



# CENTRE FOR ECONOMIC DATA AND ANALYSIS (CEDA)

The Economics Department of Ashoka University has set up the Centre for Economic Data and Analysis (CEDA) to facilitate informed debate about economic and social developments in India. CEDA also aims to directly contribute to public discussions on policy-relevant issues by generating written content in the form of blog posts, summaries of research papers, commentaries on economic and social issues etc. Through CEDA Charts page one can browse through a diverse range of visualizations organised by categories.

The visualizations are available for download as well as sharing on various social media platforms. One can search for charts and visualizations related to a particular topic like employment, skilling, female labour force participation etc.





## TRIVEDI CENTRE FOR POLITICAL DATA



The Trivedi Centre for Political Data aims at promoting data-driven research, policy work on India's political life by generating and disseminating the scientifically collected and treated political data in open access. This enhances the knowledge and understanding of political processes and dynamics by conducting research on the basis of the data collected. TCPD also improves the quality of existing public data by developing and providing access to web-based tools adapted to Indian data. TCPD aims to become a reference source of political data for researchers, journalists, students and citizens.

To align with the goals, the center has a high quality research infrastructure which includes data sets, tools, repositories, magazine subscriptions.

### **LokDhaba**

It is the first freely-available, structured and cleaned data archive on Indian electoral outcomes at the national or state level from 1962 onwards. It is a repository of Indian election results - both Vidhan Sabha (state level) and Lok Sabha (national level) - beginning 1962. This originated from the statistical reports published by the Election Commission of India. The data has been cleaned and treated by TCPD researchers and published in a tabular format. Additionally, the data from bypolls have also been integrated and a unique ID is given to each contestant which helps in tracking individuals' career trajectories over time. This is first of its kind in the context of Indian politics.

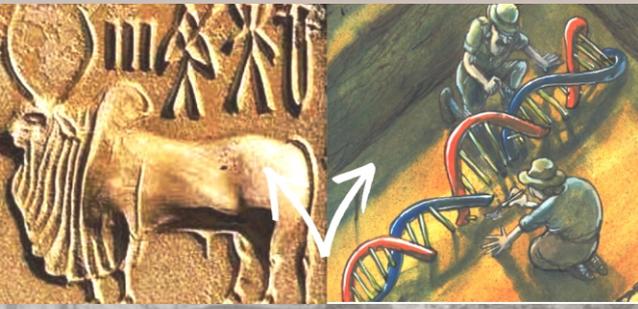
### **Surf**

An Entity Mapping and Resolution System for Indian Names. The name of the tool is a namesake of a popular washing detergent called Surf in India except that this tool is being used for cleaning strings (such as names of people and places) instead of clothes! The tool was created by TCPD members at Ashoka and is a freely available open-source program. Surf has been used extensively over several years to generate the Individual Incumbency Dataset (TCPD-IID). Anyone can easily upload their own dataset to Surf to perform similar entity resolution and ID assignment.

TCPD-IID is a dataset of candidates contesting elections with a unique politician identifier.

### **Political Career Tracker (PCT)**

Is a database which captures the career time period of Indian politicians. This is designed by TCPD, and it is a visualisation tool that measures various aspects of Indian politicians' careers. Its interface helps in visualising all candidates contesting a particular election and enables you to filter these candidates by various categories: first-time contestants, re-running incumbents, turncoats, among others. The data interface also provides information on the number of terms served by MPs and MLAs, and the number of times that the candidates have contested.



## CENTRE FOR INTERDISCIPLINARY ARCHAEOLOGICAL RESEARCH

This lab will be first of its kind in India with a focus to carry-out geochemical analysis of archaeological and geological materials and train archaeologists in the field of archae-geochemistry and Archaeological Science. Once set up, this lab will have the capacity to analyse both organic and inorganic compounds and molecules from a diverse range of archaeological samples.

### **Dirty room/storage area**

This area will be used to store, examine and prepare archaeological samples for their extraction. Archaeological samples arrive at a facility dirty, they need to be systematically cleaned and observed under microscope prior to extract samples for analysis. This step is extremely important in order to eliminate and limit any post excavation contamination. The set-up includes Wash basin with running water, Table top for sample processing, Enclosed area for drilling, Drilling Setup, Sand Blaster, Thin sectioning Unit, Low power digital Microscope for general observation, Oven, Refrigerator.

### **Clean Room/extraction area:**

A clean room facility is crucial for archaeological research to minimize modern contamination. It is used to prepare and process samples in a controlled environment. The facility houses specialized tools like a fume-hood, polarised stereo microscope (400x zoom), oven, freezer, and centrifuge for sample analysis.

### **Processing/analysis lab**

In this facility, all the samples extracted will be processed and analysed. Some of the facilities required for sample processing are already available either at Ashoka or at collaborating institutes. For instance, XRD – Available at IIT Delhi, XRF, GC-MS- Available at IIT Delhi, ICP-MS- Available at IIT Delhi, IRMS, GC, Gas Bench Configuration, Elemental Analyser, DNA Processing facility – Available at the department of Biology.



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