



WELCOME TO OUR

MBUST Insights

Contributors of this Newsletter Issue:

Dr. Sabina Shrestha, Dr. Sarbesh Das Dangol, Dr. Anupama Shrestha, and Mr. Suraj Chaudhary

Embracing New Beginnings

WELCOMING CEREMONY INSPIRES FUTURE INNOVATORS AT MBUST

By Dr. Sabina Shrestha



Welcome ceremony of 2024 November Batch

Prof. Rajendra Dhoj Joshi, President MBUST,
addressing 2024 November Batch

On November 22, 2024, MBUST held a welcoming ceremony for new students, marking the beginning of their new academic journey. The event began with the experiences of senior students and was followed by a speech from several key figures, including the Vice President, Director of the Institute, Academic Affairs Advisor, and the closing remark by the President. The program was moderated by Dr. Anupama Shrestha, initiating the sharing of personal experiences and insights from their time at the university and research work carried out by senior students. Their stories resonated with the new students, providing inspiration and a sense of belonging as they embarked on their journeys.

Vice President Padma Sunder Joshi opened the ceremony with a warm welcome, expressing excitement about the new students joining the university community. He delivered an inspiring speech emphasizing the importance of innovation, collaboration, selflessness, and teamwork in achieving collective goals. He stated, "We are here to begin innovation and invention, and we are here to learn life skills." This highlights the need for a shift from individualism to a more cooperative mindset, where working together can lead to significant differences in Nepal. He stressed the necessity of moving beyond a focus on "me and myself," advocating for selflessness and cooperation. Dr. Kirti Kusum Joshi, Director, Institute of Applied Sciences emphasized the critical need for research that is directly applicable to Nepal's context. He highlighted that the programs offered are designed not only to advance scientific knowledge but also to address practical challenges faced by industries in Nepal. Additionally, he informed that MBUST has formulated Business Incubation Center Regulations to foster innovation and support emerging businesses in Nepal. Quoting Robert Frost's famous lines from "The Road Not Taken," he urged attendees to "observe and choose the right path even if it is a less traveled one." This metaphor serves as a reminder that thoughtful choices can lead to impactful outcomes. He encouraged everyone to boost inner strength. Finally, he stressed that the success of the university is inherently linked to the success of students.

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Professor Sanjay Nath Khanal, Academic Affairs Advisor, highlighted the academic system and norms at MBUST. He highlighted key targets include fostering partnerships between academia and industry, developing technologies for economic growth, and adhering to a structured course schedule. He emphasized the significance of problem-based learning to enhance critical thinking and urged students to begin working on their research topics early, aiming for proposal defense by the end of the first semester.

Following this, the Financial Administration Consultant Mr. Binod Adhikari informed attendees of various resources available at the university, registration formalities, and house rules.

President Prof. Rajendra Dhoj Joshi in his concluding remarks, emphasized the importance of unity and collaboration within our growing family as we strive to achieve our collective goals. He stressed that students are here to make a meaningful impact on key sectors in Nepal, advocating for sustained research that prioritizes the nation's interests. Highlighting the necessity of a shared vision and strategy, he noted that without these, individual efforts can undermine national progress. Prof. Joshi acknowledged the need for inclusive development and innovation. He urged on building of a world-class university and fostering a corruption-free system. He called for philanthropic support to retain talented minds in Nepal, stating, "This is our opportunity to create history, and we must succeed."

The event was also graced by delegates from the Phutung Research Institute, enhancing the collaborative spirit of the occasion.



Vice President Padma Sunder Joshi giving welcome address



Dr. Kirti Kusum Joshi addressing 2024 November Batch



Prof. Sanjay Nath Khanal addressing 2024 November Batch



Sharing experience by PhD student Atmaz Kumar Shrestha

SOP Training for Incoming Students

ENSURING SAFETY AND EXCELLENCE IN LABORATORY PRACTICES

By Dr. Sarbesh Das Dangol

Dr. Sarbesh Das Dangol developed Standard Operating Procedures (SOPs) for students in the Organic Agriculture Program. The students were trained to adhere to laboratory rules and regulations as outlined in the SOP guidelines. The training covered standard laboratory practices, work ethics, facility security, personal protection protocols, working conditions, hygiene practices, handling of sharp instruments and glassware, chemical handling and labeling, waste disposal protocols, emergency procedures and reporting, storage protocols, and prohibited activities. Students were required to read, understand, and sign the SOPs, which were duly documented by university officials.

Madan Bhandari University of Science and Technology Standard Operating Procedures for Genomics and Tissue Culture Laboratory (GATC Lab) The Genomics and Tissue Culture Laboratory (GATC Lab) has developed the following Standard Operating Procedures (SOP) to ensure a safe environment to the researchers, people and surroundings as well as to conduct effective operation of GATC Lab facilities. The personnel working at and entering GATC Lab facility must adhere to this SOP guideline. 1. Training and Authorization 1.1 Training Requirements: - All individuals conducting experiments and working at GATC Lab facility must undergo comprehensive training. The training includes safe handling, transport, storage and disposal of research materials (plant crops, bacterial, DNA, chemicals and related materials), as well as emergency handling for accidental exposure and spills. 1.2 Documentation and Authorization: - A written and signed document of training must be completed by the individuals and the record must be maintained within the GATC Lab facility. - The training of individuals should be updated and documented. - Only individuals completing such training and aforementioned documentation shall be authorized to work at GATC Lab facility. 2. Laboratory Practices 2.1 Work Location: - The molecular biology work must be performed exclusively at GATC Lab facility and the research materials should not exit the facility without proper disposal, storage or handling. 2.2 Facility Security: - The GATC Lab facility doors and windows must remain closed at all times to create a secure environment as well as to prevent unauthorized access or contamination. 2.3 Chemical and Reagent Labeling: - All the chemicals, bottles, and other materials prepared must be clearly labeled immediately with the date of preparation, date of modification, and the name of the preparer. 3. General Laboratory Safety 3.1 Prohibited Activities: - Eating, drinking, smoking, storage of food or drink, chewing gums, application of cosmetics, etc. are strictly prohibited in the GATC Lab facility. 3.2 Personal Protective Equipment: - Tie back the long hair.	- Wear laboratory coats (buttoned up) at all times and safety glasses or face shields when needed. These Personal Protective Equipment (PPE) must be removed before leaving the laboratory. Use masks where appropriate. Dispose off the contaminated items in the designated bins within the GATC Lab facility. For autoclaving of the disposals, tie the laboratory wastes in the autoclave bags. - Always wear a clean enclosed footwear provided at the GATC Lab facility. Do not wear shoes or slippers from outside. Also, do not enter on naked feet or socks. 3.3 Working Conditions: - A single person must never work alone. There must be at least two people present simultaneously, or another person should be made aware of the individual's presence within the GATC Lab facility. The other individual should regularly monitor the GATC Lab facility for their well-being. - The first aid kits must always be available in the GATC Lab facility. 3.4 Hygiene Practices: - Wash the hands thoroughly with soap and water after completing the laboratory activities. - Remove the protective clothing before leaving the laboratory. - Use biological safety cabinet if aerosol is produced in the experiment. Use fumehood to handle hazardous and volatile chemicals. 3.5 Handling Sharp Instruments and Glassware: - Sharp materials like scalpel blades, needles and syringes, must be placed in a rigid-walled puncture-proof containers labelled "Sharp". - Glasswares must be treated with sodium hypochlorite after use, or autoclaved. 3.6 Waste Disposal: - All microbiological wastes must be autoclaved before disposal. - Disinfect equipments used for handling microbiological culture or contaminated materials chemically, if not autoclavable. - Clean and decontaminate workbenches and surfaces using disinfectant solution after the work is completed and upon spills. - Sharp materials like scalpel blades, syringes, needles and broken glasses must be disposed off in rigid-walled puncture-proof containers labelled "Sharp Object Disposal". 3.7 Storage and Incident Reporting: - The culture samples must be clearly labelled, dated and stored safely in a designated storage area. - In case of any spills, incidents or accidents, minor or major, must be reported to the GATC Lab facility coordinator. An incident report form (Appendix I) must be filled up and submitted to GATC Lab facility coordinator. The coordinator shall forward a copy via e-mail to the MBUST admin, staff and president. Implementation - The GATC Lab facility coordinator must ensure that all personnel working and entering GATC Lab facility must receive initial training with proper documentation and record-keeping.
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First Page of SOP

Second Page of SOP

- The individuals must read Material Safety Data Sheets (MSDS) before using any chemical and implement the MSDS rules.
- The GATC Lab facility coordinator must conduct regular up-to-date training on current safety practices and emergency procedures to all individuals at GATC Lab facility.
- The GATC Lab facility coordinator should maintain records of all training sessions and topics covered with dates and name of participants.
- The record must be stored in an accessible designated location.
- All individuals must regularly monitor if the doors and windows are closed and secure.
- Labeling and documentation of all materials and chemicals should be maintained and regular auditing should be performed to ensure compliance.
- For daily research activity, a research notebook should be provided by the GATC Lab facility. Every page must be signed and dated by the individual conducting research. Pictures and data from research must be updated and pasted everyday, duly signed (overlapping pasted picture and research notebook page). This is to ensure that the pictures are not manipulated or removed.

By adhering to this SOP, GATC Lab facility shall maintain a safe and efficient working environment for all individuals, mitigating risks and comply with safety regulations.

Third Page of SOP

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Appendix I:
Instructions for Training on Handling Research Materials in GATC Lab Facility

Training Objectives:

- To ensure safe handling, storage, transport, and disposal of research materials within the GATC Lab facility.
- To update emergency procedures for exposure and spills.

Training Content:

- Introduction to GATC Lab Facilities:**
 - Overview of GATC Lab facility and safety protocols.
 - Overview of various research activities performed at GATC Lab facility.
- Safe Handling Practices:**
 - Safe handling of research materials and contamination elimination.
 - Use of PPE- laboratory coats, safety glasses, gloves, and masks.
- Storage and Transport Guidelines:**
 - Proper storage of research materials.
 - Safe transportation of research materials within and outside the GATC Lab facility.
- Disposal Procedures:**
 - Safe disposal of research materials and contaminated waste.
 - Use of designated bins and waste disposal autoclaving protocols.
- Emergency Procedures:**
 - Protocols for spills, exposures, and accidents.
 - Use of emergency showers, eyewash stations, and first aid kits, and their location.

Personnel Authorization to GATC Lab Facility Form

Trainee information to be filled by the trainee:

- Name: _____
- Position/Role: _____
- Date of Training: _____

Training Content Acknowledgement: I acknowledge that I have received and understood training on the safe handling, storage, transport, and disposal of research materials within the GATC Lab facility. I have read and understood "Standard Operating Procedures for Genomics and Tissue Culture Laboratory (GATC Lab)".

Signature: _____

Supervisor/Trainer Verification: I certify that the trainee has completed the required training at GATC Lab facility and is authorized to perform related tasks under my supervision.

Signature: _____

Date: _____

Appendix I requires the respective laboratory facility to conduct and update the training sessions for the laboratory researchers and users

Appendix II:
Incident Report Form

Date of Incident: _____
Time of Incident: _____
Location of Incident: _____
Person(s) Involved: _____
Description of Incident: _____

- What happened?
- Where did it happen?
- Anything else?

Immediate Actions Taken:

Extent of Damage or Injury (if any): _____

Witnesses (if any):
[Names and contact information of any witnesses to the incident.]

1. _____
2. _____
3. _____
4. _____
5. _____

Corrective Actions Taken:

Recommendations to prevent similar future incidents:

Completed By (Name & Signature): _____
Date: _____
Approved By (Supervisor/Coordinator Name & Signature): _____
Date: _____
Please submit this completed form to the GATC Lab facility coordinator.

Appendix II ensures laboratory incidents are timely reported and documented to ensure a safe laboratory environment for everyone and to mitigate similar future incidents

Appendix III: GATC Lab Facility Cleaning Schedule

Days	Name	Screen	Map	Windows	Door	Table	Refrigerator	Laminar (Above)	Laminar (Outside)	Instrument	Signature	Remarks
Mon												
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Appendix III ensures hygiene practices

Appendix IV:
Research Notebook Format

Cover Page:

- Research Notebook
- Project Title:
- Researcher:
- Affiliation: GATC Lab Facility, MBUST
- Date Range: [] to []
- Phone number

Sample Numbering:

- Initials of the researcher and the volume number of the research notebook-Page Number Sample Number (Eg- SDI-14.1 for first volume / SDII-37.9 for second volume)

Page Layout:

- Page Number: Bottom Right
- Date: Top Right Corner

Daily Entry Format:

Each page must include the following:

- Date
- Page number
- Experiment name
- Results and analysis (Pictures and Data):
 - Each picture and data entry pasted should be signed overlapping the pasted sheet and the research notebook page.
 - Do not alter anything pasted. Do not cross or remove the page. Instead, correct the wrong entry on a new page, and mention the page number containing error.
 - All raw files and data must be stored safely on your computer.
- Signature: Bottom page.

Storage and Access:

- Store the research notebook at the designated space within the GATC Lab facility.
- Access: Research notebooks must be accessible for inspections, audits, and other authorized personnel.

Appendix IV ensures regular maintenance of Research Notebooks

Appendix I has been designed to ensure that the SOPs are read and understood by all researchers and workers in the respective laboratory facility, trained and verified by the authorized trainer with proper documentation through signatures and records of training completion. For any minor or major incidents of significance, the incident report form in Appendix II serves as a precautionary measure to ensure laboratory safety and provide a reference for preventing similar incidents in the future. Appendix III outlines a schedule for cleaning the laboratory and maintaining good laboratory and hygiene practices. Appendix IV mandates that all researchers working in the respective laboratory facility maintain up-to-date research notebooks. Appendix V ensures that good academic and research integrity is duly maintained at all times.

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Appendix V:
Madan Bhandari University of Science and Technology (MBUST)
Genomics and Tissue Culture Laboratory (GATC Lab) Facility

Principal Investigator:

Date:

This policy applies to all individuals engaged in research activities at the GATC Lab facility. I acknowledge that I have been instructed on scientific ethics, GATC Lab facility SOP, record-keeping, and the prevention of scientific misconduct. I declare that I have fully understood the following points, and that the violation of any of the instruction shall result in disciplinary action against me.

1. **Research Misconduct:** Research misconduct includes fabrication, falsification, plagiarism, and breach of material transfer agreements (MTAs).
2. **Scientific Record Keeping:** I will maintain a research notebook everyday with comprehensive details. Original raw data will be recorded promptly and accurately in the research notebook. I understand that falsifying and tampering with research records is NOT acceptable. I will make sure that the research notebook will remain in the GATC Lab facility and that it will be readily accessible to the authorities upon request.
3. **Laboratory Safety and Chemical and Equipment Usage:** I will adhere to the GATC Lab facility SOP instructions, rules and regulations.
4. **Safety and Communication:** I will promptly inform relevant authorities in case of emergencies, minor or major incidences or equipment malfunction.
5. **Attendance and Compliance:** I will regularly attend laboratory sessions, meetings, and follow instructions from investigators and program coordinator(s). I will complete assigned tasks and adhere to facility and university guidelines.
6. **Laboratory Protocols:** I will log in my full name and signature in the equipment logbook before and after usage. I will maintain cleanliness in the laboratory and adhere to scheduled cleaning and locking procedures as assigned. I will refrain from eating, drinking, creating noise, or engaging in inappropriate activities within the laboratory premises. If playing music or listening to podcasts/radio while working, or watching video during the periodic breaks, I will make sure the sound is kept low and does not disturb my peers. I will foster positive relationships with laboratory peers and department members.
7. **Health and Well-Being:** I recognize the importance of maintaining my physical and mental health. I will communicate any personal challenges to investigators and seek their support as needed.

Full Name:

Signature:

Date:

Location:

Appendix V ensures good academic and research integrity

MOU and MTAs Signed

STRENGTHENING RESEARCH COLLABORATION AND FACILITATING RESOURCE SHARING

By Dr. Sarbesh Das Dangol



Our university recently signed a Memorandum of Understanding (MoU) with the Central Department of Biotechnology, Tribhuvan University (CDBT-TU) to foster collaborative research and innovation, as well as promote entrepreneurship in the field of life sciences. The MoU was signed by Prof. Dr. Rajendra Dhoj Joshi from MBUST and Prof. Dr. Krishna Das Manandhar from CDBT-TU, with Dr. Sarbesh Das Dangol from MBUST and Dr. Jarina Joshi from CDBT-TU serving as witnesses.

The Material Transfer Agreement (MTA) for plasmid DNA documentation was obtained by MBUST from the University of California- San Diego, University of California- Berkeley, Howard Hughes Medical Institute, Stanford University, Oak Ridge National Laboratory, and the University of California- Davis.

Educational Visit

HIGH SCHOOL STUDENTS VISITED PPBCR FACILITY

By Dr. Anupama Shrestha



On November 25, the high school students from Sunflower Academy visited MBUST as part of their educational tour. Dr. Shrestha explained to the young minds about the University, its laboratories, and ongoing research. A few students asked questions when she told them about the bacteria that could control plant diseases. Dr. Shrestha explained how microorganisms could help improve soil quality and control plant diseases. She also discussed the necessity of organic food and how organic farming could bring healthy foods to our tables.



Knowing Plant Disease

EARLY BLIGHT DISEASE

By Suraj Chaudhary and Dr. Anupama Shrestha
Plant Protection Biological Control Research Center (PPBCR)

Introduction: Early blight is common disease of tomato worldwide, especially in warm, wet regions. Areas with consistent moisture often face chronic issues. It is caused by a fungal pathogen *Alternaria solani*.

Symptoms:

Leaves

- Initial Symptoms: Small, dark spots on older leaves, developing into target-like lesions with yellowing (chlorosis) around them.
- Progression: Lesions enlarge, causing defoliation and weakening the plant, exposing fruits to sunscald.

Stems

- Lesions: Dark, sunken spots that can girdle stems, leading to wilting and potential plant death, especially in young plants.

Fruits (Tomatoes)

- Early Signs: Small, dark, sunken spots near the stem with a yellow halo.
- Advanced Disease: Lesions enlarge, causing fruit rot and cracking, leading to reduced yield and market value.

How to manage?

Cultural Practices

- Crop Rotation: Rotate with non-host crops (e.g., cereals, legumes) for 2-3 years to reduce soil pathogen load.
- Sanitation: Remove infected plant debris and maintain field hygiene to prevent spore spread.
- Spacing and Pruning: Ensure proper spacing and prune lower leaves to improve air circulation and reduce soil splash.

Resistant Varieties

- Plant Selection: Use resistant varieties like 'Iron Lady' for tomatoes and 'Defender' for potatoes, and start with certified disease-free seeds.

Organic Treatments

- Copper-based Fungicides: Apply preventively, especially in humid conditions, to create a protective barrier.
- Neem Oil: Use as a foliar spray to inhibit fungal growth and spread.
- Compost Teas: Enhance soil health with compost teas, which contain beneficial microorganisms that suppress *A. solani*.

Environmental Control

- Mulching: Apply organic mulch to prevent soil splash and conserve moisture.
- Irrigation Management: Use drip irrigation to keep foliage dry and water early in the morning to reduce fungal growth.

Biological Control

To control early blight, apply *Trichoderma* spp. or *Pseudomonas fluorescens* to seeds or soil, use *Bacillus subtilis* as a foliar spray, inoculate the soil with mycorrhizal fungi during planting, and routinely add compost to improve soil health and inhibit the fungus.



Alternaria disease; Disease symptoms in tomato leaf; Disease symptoms in tomato fruit; microscopic observation of *Alternaria*.

© Photo by Dr. Anupama Shrestha, PPBCR, MBUST

Initiation of Chandragiri Community Forest Plant Diversity Study

WILD EDIBLES AND AGROFORESTRY FOR SUSTAINABLE USE

By Dr. Sabina Shrestha

Forest Biomaterials Science and Engineering Program team has taken initiative and commenced a field visit to the Chandragiri Community Forest, focusing on the preparation of a plant inventory and assessing the potential species for agroforestry. This exploration is particularly timely as during November the forest is currently experiencing flowering and fruiting seasons for some species such as Mahelo (*Viburnum mullaha*), Jamane Mandro (*Berberis napaulensis*), and Puwale (*Ilex excelsa*). The documentation of ecological and economic significance are necessary for understanding resources.



Wild edible fruits of *Viburnum mullaha*



Wild edible flowers of *Berberis napaulensis*



Forest Biomaterials team Dr. Saurabha Bhattari, Binita Silwal, Nawaraj Pandey, Dr. Sabina Shrestha and Pradeep Jimba during collection of samples for herbarium

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