Forensic
Hackathon 2020

14-15 March 2020

Organized by
Gujarat Forensic Sciences University, Gandhinagar

In Association with
Directorate of Forensic Science Services (DFSS), New Delhi

Supported and Funded by
Ministry of Home Affairs (MHA), Govt. of India

ABOUT GFSU

Gujarat Forensic Sciences University (GFSU) was established by the Government of Gujarat under the aegis of Ministry of Home Affairs (MHA) in 2009 with a prime objective to provide highly qualified experts in the areas of forensic and allied sciences to the country and the world. GFSU is a unique and only university across the world, dedicated to Forensic & Investigative Sciences. GFSU also plays a vital role in strengthening the Criminal Justice Delivery System by imparting training to the officers of the respective system. The university is accredited by National Assessment and Accreditation Council (NAAC) MHRD, Government of India and awarded "A" grade. The GFSU conducts more than 41 PG programs and doctoral program in the field of Forensic Sciences, Cyber Security, Digital Forensics and Behavioral sciences. The university creates skilled manpower in the field of Criminal Investigation, those are expertised in advanced scientific techniques. GFSU imparts exclusive academic programmes related to forensic science and its allied fields including M. Sc. Forensic Science, M. Tech. Cyber Security & Incident Response, M. Sc. Digital Forensics, M. Sc. Cyber Security, MBA in Cyber Security Management, Forensic Pharmacy, Forensic Odontology, Forensic Psychology and other allied programmes.

ABOUT DIRECTORATE OF FORENSIC SCIENCE SERVICES (DFSS)

The Directorate of Forensic Science services (DFSS), was created in the year 2002 by Ministry of Home Affairs, Govt. of India. DFSS is the Nodal Agency under Ministry of Home Affairs, Govt. of India, which is entrusted with the task to improve and promote the Forensic science practices in the country. There are six Central Forensic Science Laboratories under its administrative control located at Chandigarh, Hyderabad, Kolkata, Bhopal, Pune & Guwahati, which are continuously catering the needs of the investigating agencies and are providing adequate support through scientific investigation to the criminal justice delivery system. Examination of crime cases in each CFSL is organized into thirteen scientific disciplines/ division's of forensics viz. Physics, Ballistics, Document, Chemistry, Explosive, Toxicology, Narcotics, Biology, DNA, Cyber Forensics, Audio-Video/Mobile Forensics and Facial recognition & image processing. Casework in CFSLs consists of methodical examinations characterized by a high volume of crime exhibits and the interpretation of the significant findings in the context of the crime. The DFSS is engaged to accomplish its mission of rendering 'high quality and credible forensic services' to justice delivery system of India.

THE CHALLENGES

Forensic science is one of the most integral components of criminal justice delivery system. Rapid and accurate forensic investigation helps the police and judiciary for quicker disposal of criminal cases. Forensic expert minutely search and collect all the evidences from the scene of crime and analyze them for supporting the justice delivery system. These evidences may be in any form like blood, body fluid, fingerprints, fire arms, gun shot residue, hard drives, computers and documents, etc. to establish how a crime took place. As the developments in science and technologies has helped the criminals to change their modus operandi, it is imperative to strengthen all the pillars of criminal investigations with latest developments and novel thoughts of science and engineering. According to recent reports of National Crime Records Bureau, the conviction rate in different criminal activities lies between 20% to 43% only. The major reasons behind low conviction rate are 1) Lack of investigative infrastructure 2) Lack of trained forensic investigators, particularly crime scene investigators 3) Improper handling and analysis of evidences 4) lack of advancement in forensic tools and techniques and 5) high cost of instruments and reagents associated with investigation, which are mostly imported. Considering the above limitations and rapid increase in the complex criminal activities, it is thus necessary to provide a common platform where all stakeholders i.e. police, judiciary, investigative agencies, forensic scientists, academia and industries along with the students could deliberate these issues in length and come up with new ideas/concepts and technology transfer which will strengthen justice delivery system.

Innovate   Incubate   Compete   Collaborate

Forensic Hackathon 2020

During the past few years, both the state and central governments have been emphasizing the need to encourage Innovation and Incubation. As of now, India is ranked among the top three start-up friendly ecosystems in the world. Programs like Atal Innovation Mission, PM Research Fellowships, Start-up India Abhiyaan are the foundations to establish India as a global epicenter of innovation. To support, 'Make in India' policy of Government of India, Gujarat Forensic Sciences University in collaboration with Directorate of Forensic Science Services (DFSS) and under the auspicious of Ministry of Home Affairs, Government of India is organizing **Forensic Hackathon** on 14-15 March 2020, with an objective of resolving the issues related to forensic investigations and applying forensic science and there by strengthing the justice delivery system. The hackathon shall have active participation of all the learning partners such as: Central / State Forensic Science Laboratories of India and industries engaged in manufacturing forensic tools. Learning partners will be providing tools for easy learning and problem solving skills to start-ups, innovators and collaborators. The aim of this Forensic Hackathon is to make a positive impact in crime investigation and crime prevention. The event will also discuss and deliberate all important issues and experiences to improve criminal justice delivery ecosystem.

Through this event, all the stakeholders will come together to solve the following issues:

- Create feasible, viable and simplified solutions that could help police, judiciary and forensic scientists to use science and technology for crime investigation.
- Discussion on new ideas that connect the scientific methods of crime investigation including forensic investigation in an effective and valuable way for justice delivery system.
- Create solutions that address the need to keep crime investigation cost effective.

The focus of the Forensic Hackathon is to create competitive sprits and collaborative efforts among all the stake holders. This national level hackathon shall provide a platform to the participants to transform their ideas into the innovative solutions addressing the current challenges related to criminal investigation. This hackathon will bring the young and bright minds together to solve the issues related to criminal investigations based on forensic sciences. The participants will get expert guidance, leadership, supervision and assistance from forensic and technical professionals. They will also get access to cutting edge technology for solving their problems. The participants are expected to evaluate their ideas and innovative skills to provide feasible, viable, economical and realistic solution to the selected problem in a given time frame. The solutions found in the forensic hackathon may be translated into the start-ups for tomorrow.

For the participants, this would be an ideal opportunity/platform wherein ideas/products from the students or professionals will be monitored and supported by the Government of India which will provide opportunities to present their solutions for forensic advancement and mitigating challenges. The event will allow participants to indulge in a non-stop 48-hours technical and scientific marathon. Participants from all over the nation are invited to participate in the hackathon, to convert their ideas into products and solutions under various categories of Forensic domain. Government of India and State Governments will also help the novel and innovative ideas or prototypes emerged from Forensic Hackathon by supporting and converting into startups.

OBJECTIVES OF FORENSIC HACKATHON 2020

- To discuss with forensic scientists of Central and State Forensic Science Laboratories to understand their problems related to the scientific investigations of crimes where forensic science plays major role.
- To find the creative ideas which may produce next generation methodologies or products which could help in the crime investigation particularly crimes against women and children.   .
- To identify companies which are interested in manufacturing tools and technologies related to forensic science.   .
- To encourage the competitive spirit among the students of IITs/IISc or eminent institutes/universities and colleges to shape-up their ideas.   .

MAJOR THEMES

FORENSIC PHYSICAL SCIENCES (Physics, Ballistics)

I. Development of device for collection and detection of Fumes and Vapours produced by inflatable substances.

II. Determination of Age of Ink

III. Determination of Sequence of Strokes Automatic identification of signatures/handwriting

IV. Examination of digitally manipulated and machine generated document.

V. Computerized technique for identification of fired ammunition with respect to Fire Arms and creation of database.

VI. 3D Forensic Facial Reconstruction

VII. Tools for Preventive Forensics

FORENSIC CHEMICAL SCIENCES
(Chemistry, Explosive, Toxicology, Narcotics, etc.)

I. Development of Software for determination of geographic origin of drugs of abuse based on intermediate reaction reagents & adulterants residues.

II. Method development for analysis of animal poisons in biological samples

III. Development of standards for narcotic drugs.

IV. Development of android based image processing mobile application for automatic quantification of Thin Layer Chromatography spots.

FORENSIC BIOLOGICAL SCIENCES
(Serology & DNA)

I. On the spot identification of source of biological fluids (saliva, semen, urine etc.)

II. Exact age estimation of a person

III. Predicting suitability of bones for DNA profiling

IV. Development of kits for age estimation of biological fluids for forensic application

V. Development of X-STR/Y-STR/Autosomal Kits indigenously.

VI. Hand held normal PCR or Real time PCR

VII. Development of cost effective and reliable instruments particularly for crime against women.

FORENSICS ELECTRONICS
(Cyber/Computer Forensics, Mobile Forensics, Audio-Video, etc.)

I. Development of software for recovery of overwritten/deleted files from CCTV/DVR/Hard Disk.

II. Reconstruction of corrupt/bad sector video files retrieved from CCTV/DVR. Enhancement of CCTV Footage.

III. Computerized approach for decrypting data from encrypted disk partition.

IV. Recovery of previous user data from factory reset phones and formatted flash memory.

V. Decryption of WhatsApp database files retrieved from phone memory.

VI. Development of software for authentication of audio-video footage.

VII. Drone Forensic Tools

FORENSIC PSYCHOLOGY

I. Forensic Assessment of Criminal behavior and its future predictability

II. Police/Army Psychology: Recruitment, their stress management and intervention

III. Rehabilitation modules for Juveniles.

IV. Prison Psychology: Development of Counselling, intervention, coping skills and improving subjective well- being training and rehabilitation program for prisoners/Jailor/relatives of prisoners.

V. Psychological Challenges in Schools/Colleges: For prediction of violent behavior among students, suicidal tendencies, bullying in children.

VI. Challenges for NGOs: Counselling and to develop rehabilitative modules for victims of domestic violence and rape, child rights, child custody, divorce cases etc.

VII. Neuro-Psycho-Behavioral Profiling of Criminals

VIII. Cyber Psychology: Cyber stalking, Cyber bullying, Cyber Addiction

Above mentioned topics are broad and not exclusive in nature. Any technology which helps in the crime investigation and crime prevention can be included in the list.
The tentative list of Problem statements as well as list of faculty guides will also be available on the GFSU and DFSS website. The participants can contact the guides/experts for further guidance.

Innovate   Incubate   Compete   Collaborate

WHO CAN PARTICIPATE?

- **Students of Universities / Colleges from all over India.**
- **Technocrats, academicians, scientists, police, judiciary**
- **Industry partners especially Indian manufacturing companies**
- **Potential entrepreneurs**
- **Startups**

NO REGISTRATION FEES

**EXPECTED NUMBER OF PARTICIPANTS**   500 participants from all over India.

TEAM COMPOSITION

FOR STUDENTS CATEGORY : **1.** Maximum three (3) members in a team. **2.** Each team must incorporate currently enrolled students in an educational institution in India (student ID numbers and a copy of ID must be provided for validation). **3.** One (1) local mentor per team is mandatory (in addition to the 3 members).

FOR PROFESSIONAL CATEGORY : **1.** Maximum three (3) members in a team. **2.** Each team should comprise of currently associated persons in Government or private organizations/industries of India. **3.** The team may seek help from a local mentor, if required.

REGISTRATION LINK
www.gfsu.edu.in/hackathon
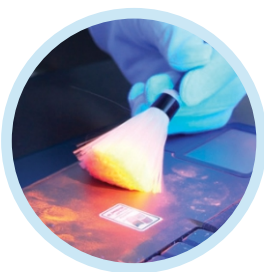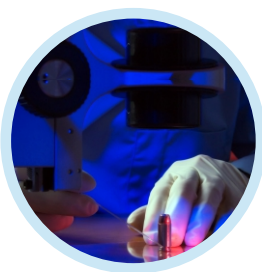
Innovate   Incubate   Compete   Collaborate   04

MENTORS

Mentors are the critical resources for the success of hackathon. They will ensure that participants are selected and deployed in the most optimal way. The mentors could be the Forensic scientists, technocrats, engineers professionals in forensic and allied sciences, judges, investigating officers and business experts among others. Mentors will help the team by direct conversations in a constructive way, building upon what has already been done by the team.

They will broadly:

- **Help the team to gain more insight on the problems and possible solutions.**
- **Provide a scientific skill set to the teams.**
- **Provide different approaches and alternatives to solve the problems.**
- **Provide both scientific and moral support to the teams.**
- **Provide mentoring even after the hackathon event to support the best proofs of concepts to convert into prototype and further technology transfer.**

EMINENT INVITEES

- **Judges**
- **Senior Police Officers**
- **Forensic Investigators (All Directors of CFSLs and State FSLs)**
- **Academicians and Scientists**
- **Previous hackathon winners**
- **Industry Professionals**
- **Founders or proficient employees of forensic startups and reputed companies**

BENEFITS TO THE COMPANIES FOR PARTICIPATION IN FORENSIC HACKATHON

- Identifying new domains of forensic sciences to explore their business.
- Getting new ideas to develop new tools and techniques.
- Identifying talented human resource for their organization.
- Hackathon will help to establish networks among students, investigators, forensic scientists and experts, law enforcement agencies and professionals. This event can be used for job/recruitment fairs and allow the companies to assess the abilities of GFSU and other students to accomplish the tasks and how they work in a team.
- A novel method to enhance the market potential and get their brand out there to innovative, tech-savvy, healthcare-minded people in their area.
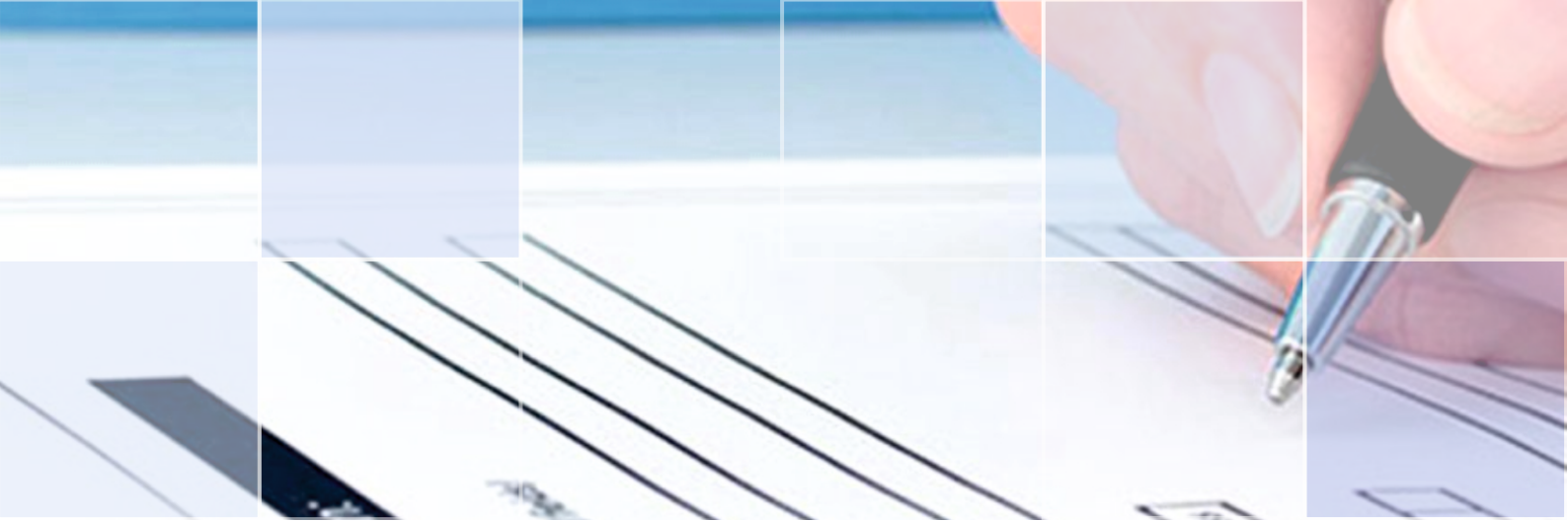
INTELLECTUAL PROPERTY

The intellectual property of the team members' will belong to the participants or jointly as applicable. The proposed relevant forensic technology should be indigenously developed, which could be actively used in the field of Forensic Science. However, more emphasis will be given to those technologies which gives advanced information that is not available currently. These "cutting-edged" technologies will be thoroughly vetted to ensure that they become accepted by leaders in the concerned field.

SCHEDULE OF INVITATION OF APPLICATIONS

- **Opening of registration portal: 05 Feb. 2020.**
- **Last Date of inviting online applications along with problem statement: 20 Feb. 2020**
- **Scrutiny of applications: From 20th Feb. to 25th Feb 2020**
- **Date of confirmation of participation: 26th Feb. 2020**
- **Date of Forensic Hackathon: 14th-15th March 2020**

Details of guidelines, format of problem statement, hackathon schedule and other details will be available on the GFSU website.

EVALUATION PROCESS DETAILS

Basic Criteria: The Judges will score eligible submissions using the following equally weighted criteria (the "Judging Criteria"):

(i) Relevant, feasible and applicable solution to the problem related to forensic science

(ii) Quality of the Idea (Indicating creativity, originality and the potential to significantly improve criminal investigation / justice delivery process.)

(iii) Value to enterprise (demonstrating the usefulness to law enforcement agencies, such as streamlining or automating investigation operations, reducing cost, efforts, response times, complications and improving the effectiveness of existing security tools.)

(iv) Technical implementation (assessing how well the idea was executed by the participants, including the user experience, the complexity of the technology or process or scenarios and whether it performs as expected)

SUBMISSION REVIEW

Judges shall not test the prototype product or process and judge the idea conversions solely based on the text description, images or video provided in the submission. The innovation should be relevant to the theme, cost effective and feasible for implementation.

LEVELS OF SCREENING OF SUBMISSIONS

- **Selecting 50 participants/teams per themes in each category (1st level screening)**
- **Selecting 10 participants/teams per themes in each category (2nd level screening)**
- **Selecting 05 participants/teams per themes in each category (3rd and final screening)**

Tie Breaker: Incase of the tie between two or more teams, the team which scored highest in first criterion (see EVALUATION PROCESS DETAILS) will be considered as the higher scoring team. In the case of any ties remain, this process will be repeated, as needed, by comparing the tied submissions' scores on the next applicable criterion. If two or more submissions are tied on all applicable criteria, the panel of Judges will vote on the tied submissions.

PRIZES FOR BEST PRODUCT / INSTRUMENT DEVELOPMENT:

Student Category
(Best Proof of Concept/ Technology Transfer)

WINNER
Rs. 3 lakh

1ST RUNNER-UP
Rs. 2 lakh

2ND RUNNER-UP
Rs. 1 lakh

Professional Category
(Best Proof of Concept/ Technology Transfer)

WINNER
Rs. 3 lakh

1ST RUNNER-UP
Rs. 2 lakh

2ND RUNNER-UP
Rs. 1 lakh

There will be 15 Prizes in each category and in total there will be 30 prizes with total awards of Rs.60 lakhs.

TENTATIVE PROGRAM: HACKATHON (D-DAY)

Day 1 (9.30 AM onwards)	Day 2
Reporting of the Teams	Mentoring and Idea Execution
Welcoming Participants	Coordinating pitch practice sessions
Keynote Speeches	Keeping teams on track to complete their projects
Hack: Presentations	
Problem Pitching	Lunch Break
Problem Discussion	Final wrap-up of the hackathon
Lunch Break	Final presentations
Mentoring and Idea Execution	Judging Reports
Wrapping up Day 1	Awards

FINAL PRESENTATION

Each team has to give a final presentation of 8 to10 minutes. This will also including questions and answers
The participants are encouraged to address three main aspects in their presentation mentioned below:

- **The problem being addressed by the team and why it is important**

- **What new solution or technology they are proposing**

- **The business model that accompanies it**

It is crucial for teams to acknowledge what they accomplished over the event of the hackathon. If any teams come in with pre-existing projects, they have to inform the judges that from where they started.

Forensic Hackathon 2020

PROBABLE OUTCOME OF THE FORENSIC HACKATHON 2020

- Boost-up the research and development in the domain of Forensic Sciences

- Exchange of ideas among the students, forensic scientists, industry professionals, academicians and law enforcement authorities

- Conversion of ideas which could be translated into manufacturing of forensic tools in India.

LOGISTICS

The logistic facilities for hackathon such as food, local transportation, local hospitalities and AV needs (video, photography, microphones, speakers, projectors, display adapters, power cabel for each table), WIFI, access to forensic science laboratories will be provided by the GFSU. Any other specific requirements for hackathon should be carried by the participating teams.

Innovate   Incubate   Compete   Collaborate

Notes

ORGANIZING COMMITTEE

CHIEF PATRON
Dr. J.M. Vyas
Director General, GFSU, Gandhinagar

PATRON
Punya Salila Srivastava
Joint Secretary (Women Safety & Internal Security),
MHA, New Delhi, Govt. of India

CHAIRMAN
Dr. S.K. Jain
Chief Forensic Scientist & Director
Directorate of Forensic Science Services, New Delhi

VICE CHAIRMAN
Shri Anil Subramaniam
Director (WS), MHA, GOI

ORGANIZING SECRETARY
Dr. S.O. Junare
Director IFS and IMT, GFSU, Gandhinagar

JOINT ORGANIZING SECRETARY
Dr. Satish Kumar

MEMBERS
Shri C.D. Jadeja
Registrar, GFSU

The Directors & Dy. Directors, All Central Forensic Science Laboratory (CFSLs)

Shri H.P. Sanghavi
Addl. Director, DFS, Gandhinagar

Dr. Brig. K. K. Tripathi
Director, IBS, GFSU

Dr. P. Maity,
Director, IRD, GFSU

Dr. Naveen Chaudhary	**Dr. Digvijaysinh Rathod**
Dr. Rakhi Agarwal	**Dr. Haresh Barot**
Dr. Parag Rughani	**Dr. Pooja Ahuja**
Dr. Deepak Rawtani	**Dr. Bhargav C. Patel**
Dr. G. Rajesh Babu	**Dr. Surbhi Mathur**
Dr. Astha Pandey	**Dr. Abraham Johnson**

VENUE

GFSU
NAAC Accredited 'A' Grade

Gujarat Forensic Sciences University
Knowledge | Wisdom | Fulfilment

GUJARAT FORENSIC SCIENCES UNIVERSITY

Sector 9, Gandhinagar-382007,
Gujarat-India.

+91-79-23977102
hackthon@gfsu.edu.in

www.gfsu.edu.in