

The background of the slide is a photograph of a campus. In the foreground, there are large, mature trees with thick trunks and dense green foliage. A path or road is visible through the trees. In the background, a multi-story building with a light-colored facade is partially visible. The overall scene is bright and sunny.

IIITH Research College Affiliate Program

Objective: multi pronged capability enablement thru IIITH research

College	
Expand research capability & connect for the college Joint research projects with IIITH, sharing research potential Students & Faculty development (thru research programs)	
Students	Faculty
Gain research knowledge and get exposed to latest developments Inspire to pursue research (or atleast deeptech jobs)	Expose faculty to emerging research Connect with researchers to excite and inspire Trigger new collaborative projects with IIITH

The IIITH-College Research-Affiliate Program

- A 3-fold program catering to the needs of students and faculties as well as creating value for the institutes
- With research as core focus
- And imparting knowledge transfer with partner institutes on research expertise
- Connecting with brilliant minds interested in research and latest developments
- With research advisory at institute levels on strategy and funding aspects of combined programs
- Catering to multiple projects partnered with institutes on latest tech areas and anchored by IIITH

Building on IIITH Research

IIITH

An institution with research at the core with an emphasis on technology and applies research for industry and society.

Visual Information & Technology	Language Technology /NLP	Software Engineering	VLSI & Embedded Systems
Data Engineering	Robotics	Signal Processing & Comm	Security, Theory and Algorithms
IT for Agriculture & Rural Development	IT for Building Science	Computational Nat Sci & Bioinformatics	IT in Education
Earthquake Engg	Cognitive Science	Exact Humanities	Systems Group
IT in eGov	IT in Building Sciences	Speech	ML

Share knowledge

- Knowledge transfer on research domains
- Exposure to latest developments around tech areas

Summer schools

- Short duration workshops
- Done by research centers on specific tech areas

Projects

- Summer projects by students
- Research oriented on specific problem statements

Faculty Dev

- Train faculty and junior faculty on research requirements

Joint research

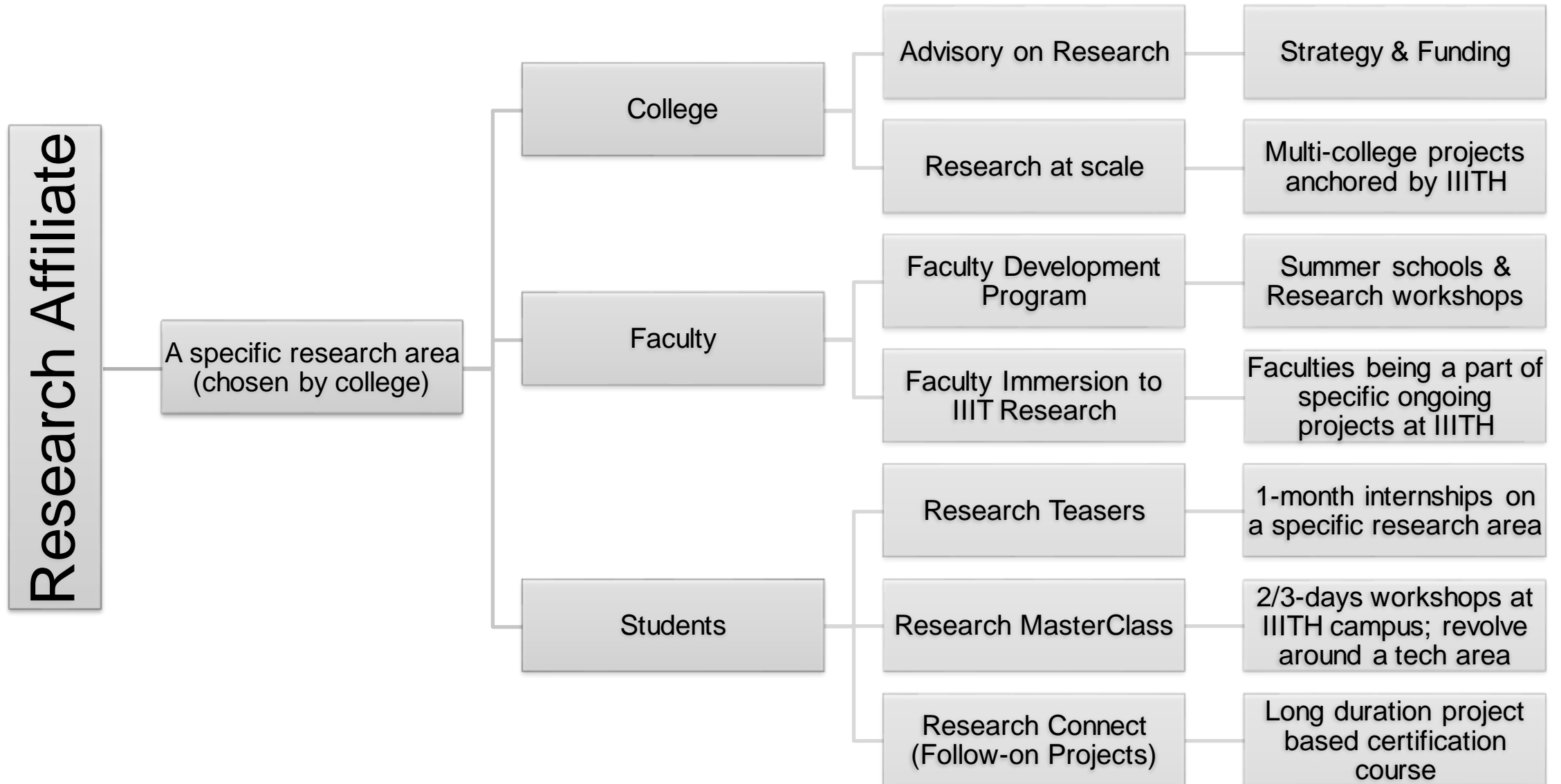
- Institutes connect together to generate solutions on specific usecases
- Contribution to social good

Approach

A set of diverse programs with research as core focus

- A set of diverse programs for faculties as well as students
- Can choose from a list of programs
 - Curated with specific requirements of student and faculties
 - Certification on fulfilling respective program criteria
- Minimal faculty involvement; mostly driven by TAs
- Involve research centres to conduct specific programs (research teasers etc.....)
- Exposure to ongoing research and specific usecases

Elements of Programs



Research Area Focus

Specific usecases from multiple research areas

Computational Imaging

Computational cinematography

CVPR 2013, CVMP 2014
Patented in France,
European patent pending

- Single high resolution camera covering the entire actions
- Virtual pan/tilt/zoom camera simulation
- Automated editing

360° Stereo Video Camera

- Single camera to capture panoramic videos
- Unique mirror facilitates a set of virtual cameras, allowing stereo capture
- Unwrap the captured image to recover two 360 degree videos
- Set up a company to produce the work

Synchronized Capture of Mobile Cameras

SyncCam
An end-to-end system for seamless sub-frame multicamera media capture for mobile devices

Everyone has cameras
Groups can do more collaborative things

HMC 2017

Depth Capture for All

Depth capture practically in everyone's hands!

ICCV 2017

NLP and Text Mining

Mining Research Trends

- Help researchers explore significant trends in the growing collection of research papers, topics, conferences, and authors.
- Solution includes paper2vec, author2vec, paper2problem, identifying similar papers, competing algorithms, recommending papers, topics and collaborators.

Computational Journalism

- Discover patterns in a users' reading behaviour for news personalisation
- Leverage news content for better recommendations
- Automatically identify unconventional news (Fake News, Bizarre News)
- Summarise news in multiple languages
- Translate news from one language to another for quicker spread

ICIS Governing Board Meeting

Hate Speech Detection

Detecting the sources and content of the Hate Speech in social networks

Automatically filtering Hate speech content and analyzing public sentiment to get to the root of the problem

Challenge: inherent complexity of the natural language constructs, different forms of hatred, different kinds of targets, different ways of representing the same meaning

Solution: Deep learning Based approach

WWW-2017 Best poster award

Equal to the governments, law and order enforcement agencies

- Automated filtering of tweets in large systems
- Filter tweets before content recommendation/learning AI
- Eliminate hate tweets
- Prevent outrage due to abusive language in public discussion forums

Paninian Applied Grammar (PAGrammar)

GOAL: Apply vyakarana shastras and Generate any natural language With the help of technology

IMPACT: Enable Common man to comprehend any language and communicate to any language speaker using their own language With the help of technology

Computational Humour

Understanding humour

Merry Christmas!

Amul Tula Joke!

Event: Christmas

Bicentenary force: Greeting

Language: Bilingual

Punning technique: Composing of two words

X-mas and moka "butter"

Resolution: Tula referring to Christmas and "You'll" as in Tula Joke is "It" referring to butter.

ICIS Governing Board Meeting

Advanced Document Summarization an

- Create a summary of documents that a human might express
- Make use of deep-learning-based on representations for large documents
- Incorporate local as well as global to capture the salience of sentences
- Create readable as well as topically coherent summaries
- In collaboration with Adobe

GHM 2017 and AAI 2018

- Grading of high volume product/service reviews
- Sentiment compression and headline generation
- Event understanding and timelines
- Automated question answering systems
- Snippet generation for search engine results

Speech Synthesis

Text-to-Speech System

Speech

Speech, Machine Learning

Soundscape Events Detection System

Speech Synthesis

Speech, Machine Learning

Speech Synthesis

Speech, Machine Learning

Speech Synthesis

Text-to-Speech System

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Analysis of Lane Level Dynamics

Slow moving traffic in heavily populated cities is a major issue

Recent advances in ITS can make things better

We introduce BLS algorithm to optimize lane level dynamics

IEEE IV 2016

Deep Reinforcement Learning for Robotic Servoing, Puzzle Solving

Deep Reinforcement Learning for Robotic Servoing, Puzzle Solving

Visual Servoing: Allows Robot to Refocus Camera on Object of Interest

Original: Sudhan (IAS), Gish Varma, CV Engineer

New Benchmark for Puzzle Solving using Machine Learning

New Deep Reinforcement Learning Solutions

Original: Mohammed, Praneel, VSR (IAS), Gish Varma

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VLSI, Embedded Systems & IOT

RF Application scenario : Remote Health Monitoring

Short range (up to 3 m)

Long distance Through Internet

Bio-telemetry

Bio-instrumentation

RF Application scenario : Remote Health Monitoring

Stretchable thermal patch

Stretchable and wearable antenna

Unstretched antenna

Stretched antenna

Arm unfused

Arm fused

LoRaWAN

LoRaWAN

LoRaWAN

LoRaWAN

LoRaWAN

Computational Natural Sciences

Computational Chemistry

AI/ML for Science

Quantum Physics

Nanosciences

Computational & Systems Biology

Multi-Scale Modeling

Antigen Binding

Drug carrier

Fluorescent imaging

Shape recognition

Time

Length

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Multi-Scale Modeling

Antigen Binding

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Length

Robotics

One of the trajectory is chosen based on predetermined GPS waypoints

Autonomous Mapping for a Payload Carrying Drone

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Novel Robotic Mechanisms: ICRA'14, IROS'15

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- Can climb steep vertical obstacle
- Can climb stairs
- Can detach itself to become multiple robots on a level plane
- Can attach itself to become a stair climber
- Technology transferred to DRDO lab

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#1 Faculty Development Program

- Workshops on emerging research areas
 - To understand research aspects on a specific area
- Research summer schools
 - Meet researchers across country
 - Understand the latest works happening in the research area
- Get trained in tools and applications on diverse domains pertaining to latest in research

SUMMER SCHOOLS

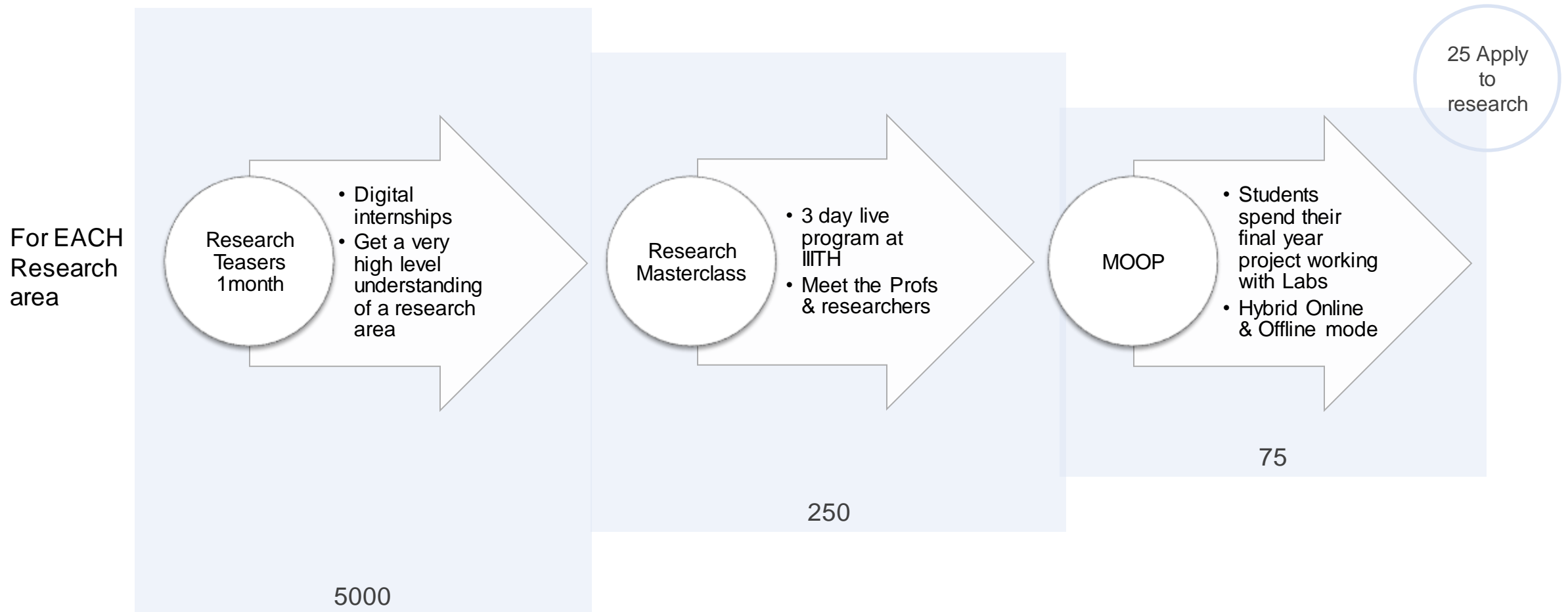
- Short programs; 5 days duration
 - Consists of a series of lectures and demo/lab sessions along with expert talks and interactions
 - To discuss & exchange research ideas
 - To catalyze high quality research
 - For better understanding of theoretical and practical aspects
 - Conducted by a research center depending on the research domain
 - To connect with top research groups as well as second and third tier institutes
-
- To provide training to faculty at school and colleges on various aspects of research. To provide training to junior research faculties.

#2 Faculty Immersion

- Faculty to spend 3-12 months at a research lab at IIITH
 - Resident program at IIITH
- Part of a project/Prof's team
 - Understand research aspects in ongoing projects
- Generate ideas on specific problem statements/usecases
- Work with research groups already engaged in projects
- May lead to publication depending on the quality of work done

Student programs

Build Research Appreciation amongst students



#3 Students: Research Teasers

- A research teaser for 3rd and final year engineering and sciences students
- More hands on applications
- Platform based delivery
- 4 weeks of basic program done on a very large scale
 - First 2 weeks on basics & applications
 - Last 2 weeks project
 - Quizzes & assignments at each milestone
 - Live classes + recorded videos
 - Mostly driven by Tas
 - Faculty to create overall structure
- Top performers go to the advanced level with deeper involvement at the Institute



IIIT HYDERABAD ANNOUNCES RESEARCH TEASER INTERNSHIPS '21

Here's your chance to experience the cutting edge work being done at one of the finest research institutions in the world. Project based online Internship Program in emerging technologies under the mentorship of professors.

ONLINE INTERNSHIP PROGRAM IN **IoT**

You will get first hand experience in building an IoT system for a practical problem using sensors/actuators, microcontroller boards and knowledge of some basic IoT protocols. You will also gain knowledge on how to leverage OneM2M standard for IoT applications.

Eligibility: Basic knowledge of computer programming (any language) and working knowledge of computer software & hardware.

Duration: 4 Weeks

Instructors: Prof Deepak Gangadharan, Prof Sachin Chaudhari, Anuradha Vattam

Powered by **Conduira Online**

5 April, 2021

Register at: <https://bit.ly/3s3FajN>



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ONLINE INTERNSHIP PROGRAM IN **SPEECH PROCESSING**

Nowadays, speech applications like Alexa, OK google, Siri etc are popular as they respond to our speech inputs. Speech recognition (Speech to text conversion) is an important module in such speech based interfaces. In this program you will learn speech processing basics and build your own speech recognition system.

Eligibility: Basic knowledge of computer programming (any language) and working knowledge of computer software & hardware.

Duration: 4 Weeks

Instructors: Prof Anil Kumar Vuppala, Prof Chiranjeevi Yarra

Powered by **Conduira Online**

29 March, 2021

Register at: <https://bit.ly/3lyXPCV>



IIIT HYDERABAD ANNOUNCES RESEARCH TEASER INTERNSHIPS '21

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ONLINE INTERNSHIP PROGRAM IN **CYBERSECURITY**

In this program, you will learn the fundamentals of Software Defined Networks (SDN) and Blockchain. Through the project in the third and fourth week of the program, you will get an in-depth understanding and field-level experience in these cutting-edge technologies.

Eligibility: Basic knowledge of computer programming (any language) and working knowledge of computer software & hardware.

Duration: 4 Weeks

Instructors: Prof Ashok Kumar Das, Prof Ankit Gangwal

Powered by **Conduira Online**

12 April, 2021

Register at: <https://bit.ly/3tbaMe>

#4 Students: Research MasterClass

Short Research Workshops

- MasterClass workshop:
 - To introduce a research area
 - Basic underlying concepts & allied Technology platforms
 - Exposure to the State of the art
 - Development models, tools & applications
 - Meet and interact with faculty and research students from the area
- To be done with
 - 1 lead faculty from Research Center
 - 1 coordinating faculty (Outreach)
 - TAs
- Typically done in 3 days with 10 hours of lectures, another 10 hours of hands on , expert lectures, demos etc.

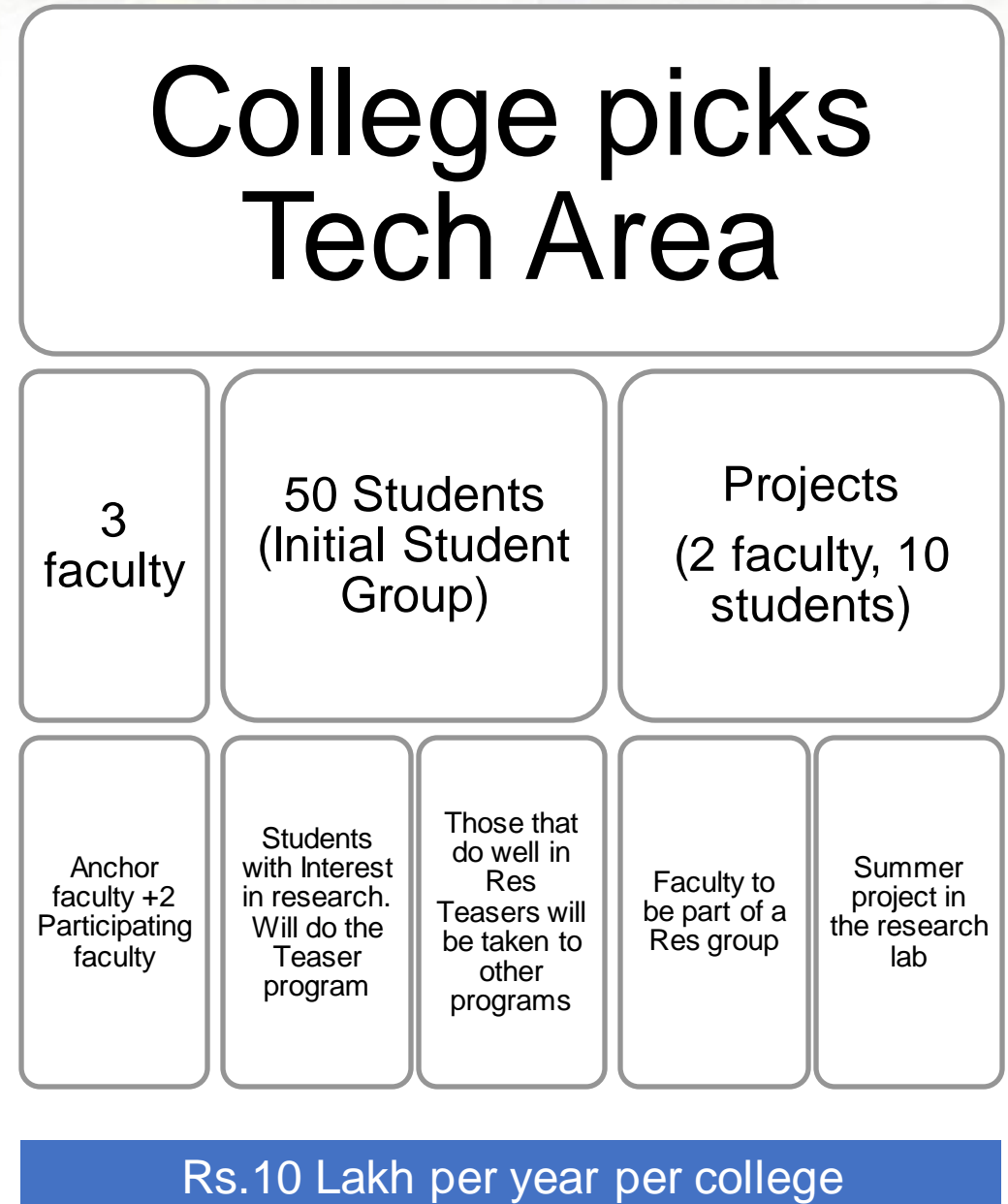
#5 Students: Research Connect ??

(with follow-on projects)

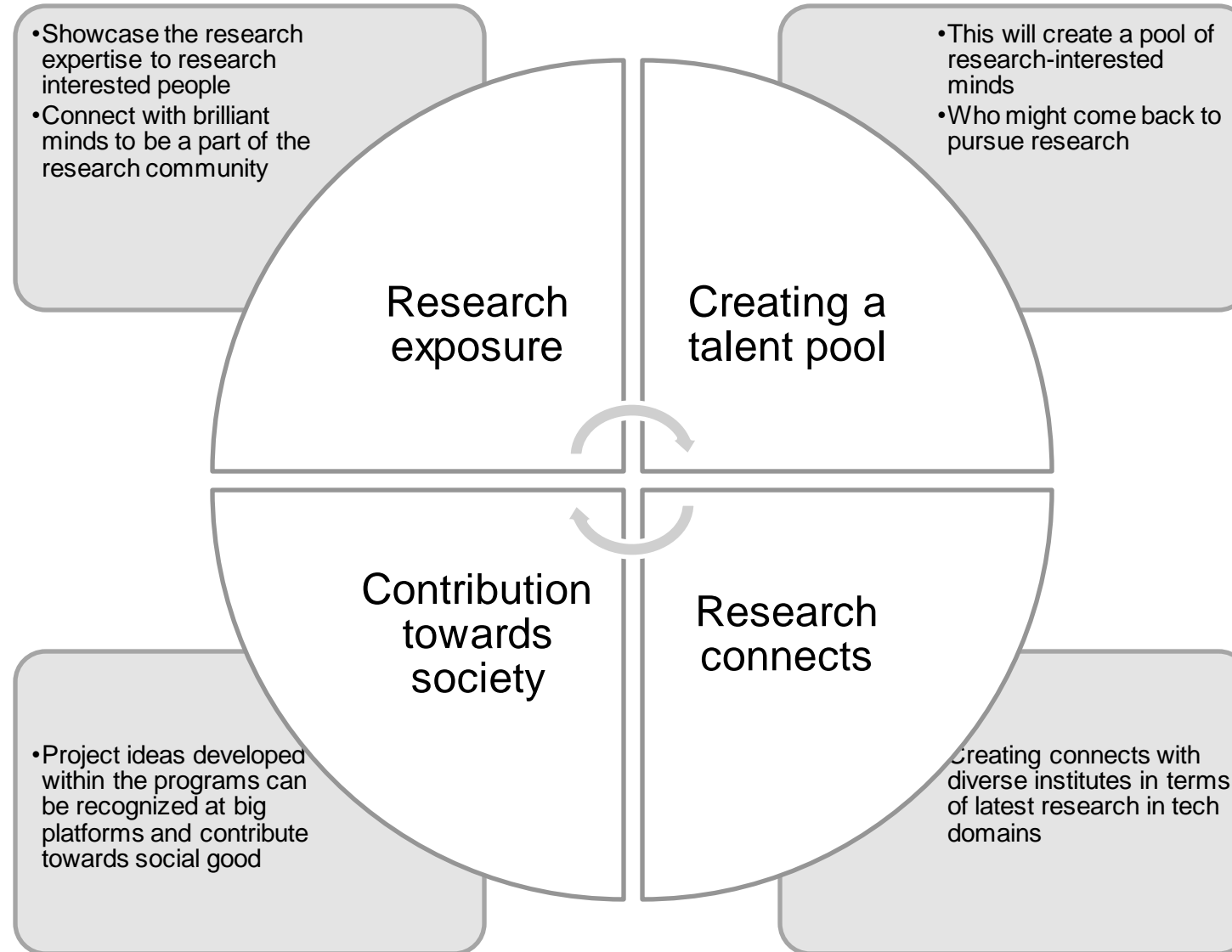
- 6-months project based certificate course
- Deep dive project-based research work
- Students enrol in a certificate course on a specific research area
 - After the course, engage in the project
 - May end up with a publication depending on quality of work done

Participation Model

- Colleges



Value to colleges





Thanks