

Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



**ADIKAVI NANNAYA UNIVERSITY**

ఆదికవి నన్నయ విశ్వవిద్యాలయము

**RAJAMAHENDRAVARAM, ANDHRA PRADESH, INDIA - 533296.**



A Brief report on Faculty Development Program

On

“Advances in Nanomaterials & Single Crystals on Practical Device Applications”

03<sup>rd</sup> February 2021

Organized by

Department Of Physics

University College of Science & Technology

Adikavi nannaya university

Rajamahendravaram

Convener: Dr. S. Rajyalakshmi

[E-mail: srl.phy@aknu.edu.in](mailto:srl.phy@aknu.edu.in)

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



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**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***INTRODUCTION***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Webinar Focus

### Introduction

Nanotechnology has gained much attention over the last decades, as it offers unique opportunities for the advancement of the next generation of sensing tools. Point-of-care (POC) devices for the selective detection of biomolecules using engineered nanoparticles have become a main research thrust in the diagnostic field. The recent advances in nanomaterials which are playing important roles in medical science and also the nanomaterials which can be potential candidates in medicine and medical device applications. The salient properties, functional activities, advantages and disadvantages of these materials are also investigated. Nanotechnology have attracted much interest for their promising potentials in cancer treatment, targeted drug delivery and high precision medical imaging devices. Nanomaterials derived super sensitive biosensors have real potential and are greatly required in early detection of rare molecular and genetic signals associated with different diseases. Nanomaterials with enhanced magnetic (i.e., paramagnetic or super-paramagnetic) properties, high electric conductivity and well surface reactivity are highly desirable in the field of nanomedicine.

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***OBJECTIVES***

# **Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

## **Aim & Objective**

The aim of the Faculty development Programme (FDP) is to provide the in-depth knowledge of advanced materials, their characteristics and applications in the advancement of nanomaterials and single crystals in Science and Technology in different domains. The FDP programme will focus to create a platform between Academia and Industry to fill the gap between research in laboratory and its industrial applications. These activities will provide the participants an exposure to the Frontier Area of Nanomaterials and its Application in Solar Cells. Development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation (SHG) and IR detector applications. This will also provide a platform for the participants to interact with the leading scientists and technologists and benefit from their vast experience in the area.

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***ORGANISERS***



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Organisers

### Chief Patron

Hon'ble Vice Chancellor, Prof Mokka Jagannadha Rao

### Patron

Prof. T. Ashok

Registrar

Dr. K. Ramaneswari

Principal, UCST

## Resource Persons

Dr. G. Ramalingam

Assistant Professor  
Dept. of Nanoscience & Technology  
Alagappa University  
Karaikudi, Tamil Nadu

Dr. Muthu Senthil Pandian

Research Scientist (Grade-II)  
SSN Research Centre  
SSN Institutions  
Chennai, Tamil Nadu

## Convener

Dr. S. Rajyalakshmi

## Co-conveners

Mrs. Y. Sushma Priya (Course Co-ordinator), Dept. of Physics, UCST, ANUR

Mr. N. S. Subba Rao, Dept. of Physics, UCST, ANUR

Mr. V. Rajasekhar, Dept. of Physics, UCST, ANUR

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

***ABOUT  
VICECHANCELLOR***



**Prof. M. Jagannadha Rao**  
**Vice Chancellor**  
**Adikavi Nannaya University**

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## *About Prof. Mokka Jagannadha Rao, Vice Chancellor*

I would like to share professional journey and achievements of our Prof. Mokka Jagannadha Rao who is a Vice Chancellor of Adikavi Nannaya University Rajamahendravaram.

He is known for his dynamic personality and his vision is to make this University as an Internationalised choice for education, research, training and consultancy.

### *Coming to his Educational Background:*

He has pursued his Ph D in Coastal Geology, Andhra University, A.P. in the year 1985 and he also holds his Masters in Mineral Preparation & Geological Engineering from the University of Alaska, USA in the year 1995.

### *His Core Specialisation areas include:*

Coastal Geology, Deltas, Mineral Resources and Processing, Petroleum Exploration, Coal, Environmental Geology, Computer, Applications Groundwater, Remote Sensing and GIS, Natural materials, Earth's Evolution.

### *Coming to his Administrative Positions in Andhra University, Visakhapatnam, AP:*

- Since 2018-till date, he is a director of Information Management Centre.
- Since 2019 – till date, he heads the Department of Geology and also a Dean for PG & Professional Examinations.
- Apart from that, he is also a Chairman, Board of Studies, Dept. of Geosciences, Ambedkar University, Srikakulam, AP, since 2012-till date.

### *Patent:*

Title: An Inventive Model that explains the Genesis of Bay of Bengal and Arabian Sea, with the funding of NRDC, Government of India, New Delhi.

### *Research Outcome:*

- He was awarded 29 PhD's and 08 were ongoing.
- He has guided 80 projects for MSc/Mtech
- 08 Research and consultancy projects
- His Publications include 76 journals, of which 30 were presented in National and International Seminars.

### *Funded Projects: As A Principal Investigator*

DOD, APMDC-DMRTUF, DST, UGC, MoES, ISRO

- He handled Major Consultancy Projects funded by ONGC.
- He conducted various National Seminars, Workshops and training Programs.
- 170 Google scholar citations with-hindex 8 and i10-index 3
- He has international collaborative ties with Australia, USA.

### *Honours and appointments*

- Member, Advisory Board on KG-PG Basin, ONGC, Chennai-2011-2014.
- Associate Editor, Indian Journal of Environment and Eco planning.
- Member, International Geological Correlation Group, National Working Group, Environmental Catastrophes.
- Member, NAAC Steering Committee.
- Management Board Member of a Number of Educational Institutions of AP and

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

Telangana.

- “Scientist of the year 2017”, by National Environmental Science Academy (NESA), New Delhi.
- “Dr. Sarvepalle Radha Krishnan Award, Best Academician of the year 2019”, by Andhra University.
- Member, Expert Committee appointed by APPCB, Govt. of AP.

### **International Visits**

- He has visited the International Universities such as University of Alaska, Fairbanks, USA. and WashingtonStateUniversity, Pullman, Seattle, USA.

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

**REGISTRAR**  
**REGISTRAR**



**Prof. T. Ashok**  
**Registrar**  
**Adikavi Nannaya University**

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

*About*  
**PRINCIPAL**



**Dr. K. Ramanswari**  
**Principal, UCST**  
**Adikavi Nannaya University**

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## *About Dr. K. Ramaeswari, Principal*

Dr. K. Ramaneswari assumed the office of the Principal on 23-01-2019. She joined the University on 10-05-2007 and is currently working as a Associate Professor of Zoology.

- ✚ She has 14 years of teaching and 18 years of tremendous research experience including post-doctoral studies.
- ✚ Her responsibilities at the University include the development and revision of Curriculum by serving as a member on Board of Studies of various affiliated colleges of the University at the Graduate level and for Post Graduate level in the University.
- ✚ As a member of Academic Council, has been responsible for introduction of New courses required to fulfil the local needs of the region and also the industry sector of the Nation at large.
- ✚ She has been nominated on various administrative positions especially as Member Executive Council of The University and Member of Governing bodies of the affiliated colleges of The University, Head Depts. of Zoology, Aquaculture, Biotechnology and Biochemistry, Additional Director of Admissions and Chief Warden Womens' Hostel, besides also working as Member on different committees of the University.
- ✚ By serving as an Advisor of the Placement, Training and Research Guidance Centre, provides on campus and off campus placements and also involved in outreach programs to the community especially through ALEAP, Govt of India.
- ✚ Her contributions till date have been recognized and State Government has bestowed the Best Teacher Award -2018.

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

***ABOUT  
RESOURCE PERSON-1***



**Dr. G. Ramalingam**

**Assistant Professor**

**Dept. of Nanoscience & Technology**

**Alagappa University**

**Karaikudi, Tamil Nadu**



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## *About Dr. G. Ramalingam*

**Dr. G. Ramalingam**, Assistant Professor, Department of Nanoscience and Technology, Group Leader-Quantum Materials Research Lab (QMRL),

Alagappa University, Science Campus, Karaikudi, Tamil Nadu, INDIA

He received his PhD from University of Madras

### ❖ His area of Research

- Quantum/Nanomaterials Research (QMR)
- Semiconductor Nanomaterials for Solar cell, Quantum LEDs (Q-LEDS) and Other Energy harvesting application.
- Graphane Quantum Dots for Industrial Application
- Highly luminescence Nanomaterials for Bio-imaging, Bio-Tagging and Nano Drug Delivery system for anti-cancer Treatment etc.,

❖ His Research projects funded by the agencies **DST-SERB, AURF-Start up grant, MHRD-SPARC & UKIERI, RUSA**

❖ He has published more than 135 research articles in peer reviewed international journals and three books

## **Distinctive Achievements / Awards**

1. Award of **Young Scientist** Fellowship from Tamilnadu State Science and Technology (Government of Tamilnadu) TNSCST-2019.
2. Innovative Scientific Research Technologist & Dedicated Academician (Nanoscience & Tech.) award by globalawards-Malaysia
3. Best Research paper award at IIT-Madras (**ISRS 2010**)
4. General Proficiency in Physics(B.Sc) –Voorhees College Vellore
5. Best Student award (B.Sc) -Voorhees College Vellore

## **Country Visited (Official) :02**

1. University of Mara Technological University -**Malaysia**
2. National University of Singapore (NUS)-**Singapore Research Collaborating Country**
3. Brunel University, **London**
4. INL – International Iberian Nanotechnology Laboratory, **Portugal**
5. CSIR lab-Pretoria, **South Africa**
6. Ural Federal University, **Russia**
7. Delaware State University -**USA**
8. Copperbelt University (CBU)- **Zambia**

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

- ❖ Number of Invited / Special Lectures delivered: **10**
- ❖ He is an Editorial member for publications
- ❖ He is an Advisory board member for National conferences
- ❖ He developed **e-content**
- ❖ He is a life member for professional bodies
- ❖ He has organized National/ International conferences/seminars/workshops

### Academic Activates

| S. No | Positions held  | Name of the Institutions    |
|-------|---|-----------------------------|
| 1.    | Department NAAC & IQAC coordinator                            | Alagappa University         |
| 2.    | University Dy.Coordinator SWAYAM                              | Alagappa University         |
| 3.    | NEHEJRF to NFHESRF Expert committee                           | Periyar EVR college, Trichy |
| 4.    | Stock verification officer                                    | Alagappa University         |
| 5.    | SPDF/PDF Scrutiny committee                                   | Alagappa University         |
| 6.    | Co-coordinator of Entrepreneurship, Innovation and Career Hub | Alagappa University         |
| 7     | Doctoral committee member                                     | VIT, Vellore                |
| 8     | Doctoral committee member                                     | Bharathidasan University    |
| 9     | Curriculum Development cell –Dept. coordinator                | Alagappa University         |
| 10    | Village Extension Programme(VEP) coordinator                  | Alagappa University         |

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

***ABOUT  
RESOURCE PERSON-2***



**Dr. Muthu Senthil Pandian**  
**Research Scientist (Grade-II)**  
**SSN Research Centre**  
**SSN Institutions**  
**Chennai, Tamil Nadu**

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Research Interests

- Crystal Growth by Solution and Melt Techniques, Single Crystals for Nonlinear Optical (NLO), Ferroelectric and Thermoelectric (TE) Applications
- Perovskite Solar Cells (PSC), Dye Sensitized Solar Cells (DSSC), Quantum Dot Sensitized Solar Cells (QDSSC), Nanomaterials and Thin Films

## Research Projects, Publications and Ph.D. Guidance

|  |   |  |
|--|---|--|
| Projects Received                        | : | <b>23 (BRNS,<br/>SERB,<br/>DST-SERI,<br/>UGC-DAE<br/><br/>Recycle3,<br/>Canada and<br/>SSNI)</b> |
| Total Budget for the projects            | : | <b>Rs. 298.81 lakh</b>   |
| Awards Received                          | : | <b>24</b>  |
| International Journal Publications       | : | <b>91</b>  |
| Conference Proceedings                   | : | <b>35</b><br>(Materials Today & AIP Proceedings)   |
| National/International Conference Papers | : | <b>180</b>   |
| Invited/Special Lectures presented       | : | <b>84</b>  |
| National Laboratory Visit                | : | <b>06</b>  |
| CCDC Filed                               | : | <b>23</b>  |
| National Seminars/Symposium organized    | : | <b>11</b>  |
| Citations for the Journal Publications   | : | <b>1333</b>  |
| h-Index                                  | : | <b>19</b>  |
| i10-Index                                | : | <b>37</b>  |

2 PhD's were awarded .He is guiding PhD scholars, **Post Doctoral Fellow, Senior Research Fellow, Junior Research Assistant.**

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## His awards: 24 awards

Best Poster Presentation Award, ISPA - Prof. S. Gunasekaran Award, Best Faculty Researcher Award, IACG - Prof. P. Ramasamy National Award for Crystal Growth, Highly Cited Author - Received Certificate of Appreciation in Royal Society of Chemistry (RSC), Best Indigenous Product Presentation Award, Young Scientist Award, Best Out Coming Project Award, Best Innovative Researcher Award, Young Researcher Award, Best Paper Presentation Award, Best Crystal Display Award, Best Oral Presentation Award,

## He is an editor, Associate Editor, Guest Editor for several Journals

He is a life member, **Research and Development Advisory Council Member, executive member for several Professional Bodies**

He is a member in Doctoral Committee for Department of Physics, VIT University, Sathyabama University, SRM University

## Member - Board of Studies

Department of Physics, Sri Vidya Mandir Arts & Science College, Katteri,Uthangarai-635307, Tamil Nadu

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***BRIEF REPORT***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Brief report

The Department of Physics, University College of Science & Technology, Adikavi Nannaya University, Ajamahendravaram organised **Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"** This prestigious Webinar was inaugurated on February 3<sup>rd</sup> 2021 at 10:30 am by Hon'ble Vice Chancellor **Prof. Mokka Jagannadha Rao**, Adikavi Nannaya University. Convener Remarks has given by the Convenor, **Dr. S. Rajyalakshmi**, Assistant Professor, Department of physics, University College of Science & Technology, AKNU. The Principal (I/c), Dr. P. Vijaya Nirmala UCST, AKNU has delivered the opening remarks of the program. **Mrs. Y. sushma Priya** Course Co-ordinator has introduced the Chief Patron, **Prof. Mokka Jagannadha Rao**. Hon'ble Vice Chancellor Prof. Mokka Jagannadha Rao, has given his inaugural address to the gathering. The First Technical session was started with an informative talk by **Dr. Muthu Senthil Pandian** on "Development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation (SHG) and IR detector applications" and introduction of **Dr. Muthu Senthil Pandian** has given by Mr. N. S. Subba Rao, Assistant Professor, Department of physics, UCST, AKNU. The second technical session was presented on "Frontier Area of Nanomaterials and its Application in Solar Cells" by **Dr. G. Ramalingam** before that introduction of **Dr. G. Ramalingam** has given by Mr. V. Rajasekhar., Assistant Professor, Department of physics, UCST, AKNU. In these two sessions, queries were given by participants in Chat box and the resource persons answered at their end of the session. Concluding remarks was presented by the Prof. T. Ashok, Registrar, ANUR

The Webinar received an overwhelming response from the faculty and the young research scientists across the country. It gives immense pleasure to share that the Department has received one thousand eighty eight (306) valuable responses and feedback from various Institutions/Universities of the Country.

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***INAGURAL ADDRESS***



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

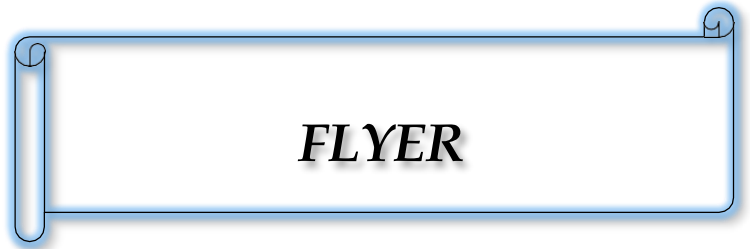
*Inuagural address by Hon'ble Vice Chancellor*

*Prof. Mokka Jagannadha Rao*

Nanotechnology has gained much attention over the last decades, as it offers unique opportunities for the advancement of the next generation of sensing tools. Point-of-care (POC) devices for the selective detection of biomolecules using engineered nanoparticles have become a main research thrust in the diagnostic field. The single crystal is essentially a single giant grain in which the arrangement of molecules exhibits strict order. Due to this, the crystal lattice is continuous and unbroken to the edges of the sample, with no grain boundaries. The absence of the defects associated with grain boundaries can give monocrystals unique properties to the single crystal materials. The Czochralski process and the Bridgeman technique are most commonly used for formation of single crystal materials. Because of the good physical properties particularly mechanical, optical and electrical. Apart from that, single crystalline diamond has extraordinary physical properties and used in abrasives, cutting and polishing tools, CO<sub>2</sub> lasers, and gyrotrons. In spite of having this much good property, due to the lack of large, high quality single crystals prevents its use in many applications. So, the formation of large single crystal at high growth rate can open a new era for applications of the material.

The Faculty development Programme (FDP) is to provide the in-depth knowledge of advanced materials, their characteristics and applications in the advancement of nanomaterials and single crystals in Science and Technology in different domains. The FDP programme will focus to create a platform between Academia and Industry to fill the gap between research in laboratory and its industrial applications. These activities will provide the participants an exposure to the Frontier Area of Nanomaterials and its Application in Solar Cells. Development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation (SHG) and IR detector applications. This will also provide a platform for the participants to interact with the leading scientists and technologists and benefit from their vast experience in the area.

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

ADIKAVI NANNAYA UNIVERSITY  
RAJAMAHENDRAVARAM



Faculty Development Programme (FDP)  
On  
Advances in Nanomaterials and Single Crystals  
for Practical Device Applications

Organized by  
Department of Physics  
University College of Science & Technology  
Adikavi Nannaya University

Date & Time: February 3rd 2021 at 10:30 am onwards

Eligibility: Faculty members, Research scholars, Students, & Academicians

Note: E-Certificate will be issued to the participants



## Chief Patron

Prof. Mokka Jagannadha Rao  
Vice Chancellor  
ANUR

## Speakers



Dr. G. Ramalingam  
Assistant Professor  
Dept. of Nano Science & Technology  
Alagappa University  
Karaikudi, Tamil Nadu



## Patron

Prof. T. Ashok  
Registrar  
ANUR



## Patron

Dr. K. Ramaneswari  
Principal, UCST  
ANUR



Dr. Muthu Senthil Pandian  
Research Scientist (Grade-II)  
SSN Research Centre  
SSN Institutions  
Chennai, Tamil Nadu

## About webinar

The aim of the Faculty development Programme (FDP) is to provide the knowledge of advanced nano materials and single crystals in Science and Technology in different domains. The FDP programme will focus to create a platform between Academia and Industry to fill the gap between research in laboratory and its industrial applications. These activities will provide the participants an exposure to the Frontier Area of Nanomaterials and its Application in Solar Cells and development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation (SHG) and IR detector applications. This will also provide a platform for the participants to interact with the leading scientists and technologists and benefit from their vast experience in the area.

## Convener

**Dr.S.Rajyalakshmi**

Email Id: srl.phy@aknu.edu.in

Ph No:9290402635

## Co-conveners

**Mrs. Y. Sushma Priya** (Course Coordinator), Dept. of Physics, ANUR

**Mr. N. Srinivasa Subba Rao**, Dept. of Physics, ANUR

**Mr. V. Rajasekhar**, Dept. of Physics, ANUR

Registration link: <https://forms.gle/KEGSwFA1XrE5EACs8>

Webinar Link will be sent to your registered email

No Registration Fee

**CLICK HERE**

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***PROGRAM SHEET***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



## **PROGRAM SHEET**

*Faculty Development Programme On "Advances in Nanomaterials and Single Crystals for Practical Device Applications"*

*February 3<sup>rd</sup> 2021 at 10:30 am*

|   |   |  |
|---|---|--|
| 10:30 am<br>Convener Remarks<br><b>Dr. S. Rajyalakshmi</b><br>Assistant Professor,<br>UCST, ANUR                              | 10:35 am<br>Opening Remarks<br><b>Dr. P. Vijaya Nirmala</b><br>Principal (I/c),<br>UCST, ANUR   | 10:40 am<br>Introduction of VC<br><b>Y. Sushma Priya,</b><br>Course Coordinator, Asstant<br>Professor, UCST, ANUR  |
| 10:45 am<br>Inaugural Address<br><b>Prof. Mokka Jagannadha Rao,</b><br>Hon'ble Vice Chancellor,<br>ANUR                       | 10:55 am<br>Introduction of Dr. G.<br>Ramalingam by <b>Mr. N. S. Subba<br/>Rao,</b> Assistant Professor,<br>UCST, ANUR  | 11:00 am<br>Speech by <b>Dr. G. Ramalingam,</b><br>Assistant Professor, Dept. of<br>Nanoscience & Technology,<br>Alagappa University, Karaikudi,<br>Tamilnadu on "Frontier Area<br>of Nanomaterials and its<br>Application in Solar Cells" |
| 11:45 am<br>Introduction of Dr. Muthu<br>Senthil Pandian, by <b>Mr. V.<br/>Rajasekhar,</b> Assistant<br>Professor, UCST, ANUR | 11:50 am<br>Speech by <b>Dr. Muthu Senthil<br/>Pandian,</b> Research Scientist<br>(Grade-II), SSN Research<br>Centre, SSN Institutions,<br>Chennai, Tamilnadu, on<br>"Development of high quality<br>nonlinear optical (NLO) and<br>ferroelectric single crystals for<br>second harmonic generation<br>(SHG) and IR detector<br>applications" | 12:20 pm<br>Concluding Remarks<br><b>Prof. T. Ashok,</b> Registrar, ANUR   |

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***ABSTRACT / FULL PAPER***

**“Frontier Area of Nanomaterials and its Application in Solar Cells”**

**Dr.G.Ramalingam**

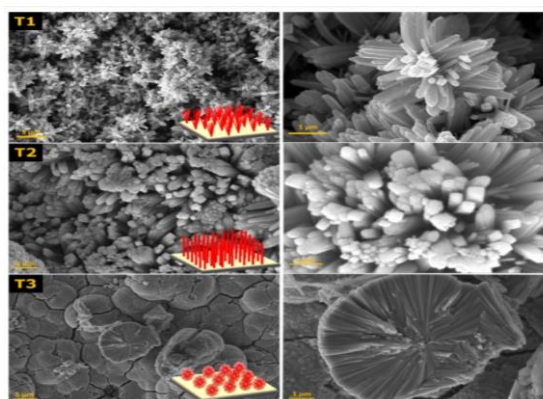
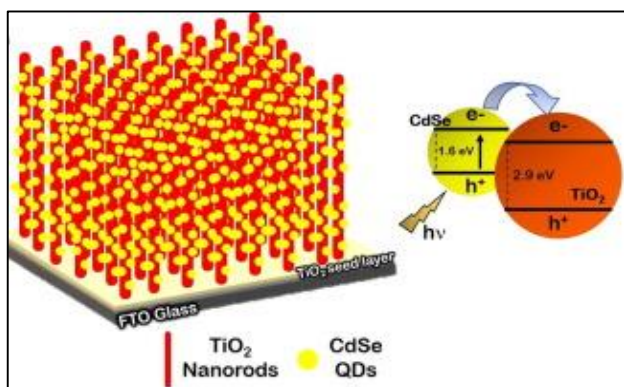
Quantum Material Research Lab(QMRL), Department of Nanoscience and Technology,  
Alagappa University, Kraikudi, Tamil Nadu-INDIA

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Abstract

The synthesis of well-aligned single-crystalline onedimensional (1D)-semiconductor nanorods (NRs), nanowires (NWs) are attracted to their potential application in photovoltaic/ solar cell. Notably, 1D single-crystalline NRs, NWs offer direct electrical pathways for photogenerated electrons, thereby increasing the electron transport rate, which improves the performance in the solar energy conversion such as a quantum dot sensitized solar cell (QDSSCs), light-emitting diodes (LEDs), etc. However, 1D-TiO<sub>2</sub> nanostructures still suffer from the issues of electron scattering or trapping at grain boundaries leading to marginal improvement of electron transport rate in QDSSC. The semiconductor QDSSC has a great deal of attention because of their tunable bandgap by adjusting nanoparticles size, shape, and

composition. In this connection, the fabrication of thin-film electrodes using 1D nanostructure has proven practical ways to control electron transport. 1D TiO<sub>2</sub> nanostructure



as in the form of nanowires (NWs), nanorods (NRs), nanotubes (NTs) with high bandgap energy (~3 eV to 3.4 eV) could supply or control a straight electron path by scaling down the recombination between QDs. Hydrothermal synthesis, a well-known bottom up method, mainly involves temperature and pressure to optimize the morphology of materials by carefully tuning the vapor pressure and temperature. Compared to other methods, this can effectively generate nanomaterials which are not stable at elevated temperature. Nanomaterials having high vapour pressure can be produced by this method with minimum loss of materials. The present work emphasizes the hydrothermal synthesis of different nanostructures. TiO<sub>2</sub> branched nanorods, unidirectional nanorods, and nanorods composed microspheres achieved merely by controlling reaction speed of the hydrothermal method. Semiconductor CdSe quantum dots were well anchored on the TiO<sub>2</sub> surface ascribed to the morphological changes, as evidenced by optical studies. The structural, optical, morphological, current density and voltage studies confirmed the effective coating of CdSe anchored into TiO<sub>2</sub>.

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Full Paper





# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



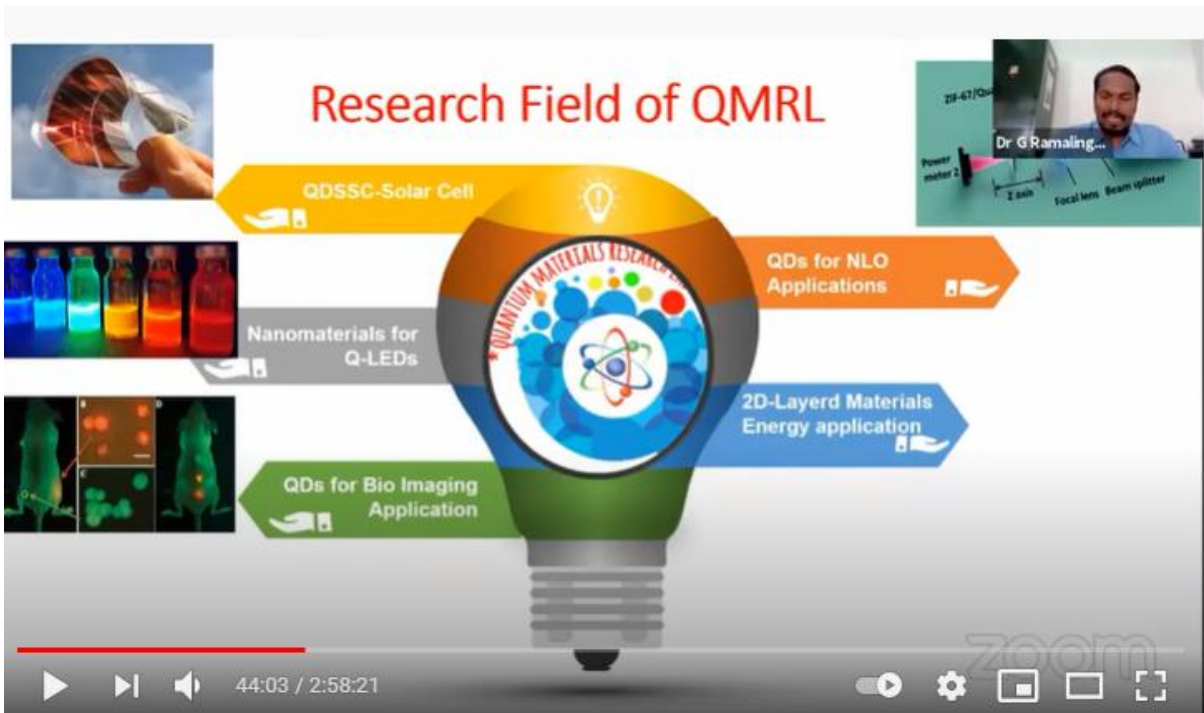
**குறள் : 396**

தொட்டனைத் தூறும் மணற்கேணி மாந்தர்க்குக்  
கற்றனைத் தூறும் அறிவு.

In sandy soil, when deep you delve, you reach the springs below;  
The more you learn, the freer streams of wisdom flow

**பொருள்**  
தோண்டத் தோண்ட ஊற்றுநீர் கிடைப்பது போலத் தொடர்ந்து  
படிக்கப் படிக்க அறிவு பெருகிக் கொண்டே இருக்கும்

42:17 / 2:58:21



## Research Field of QMRL

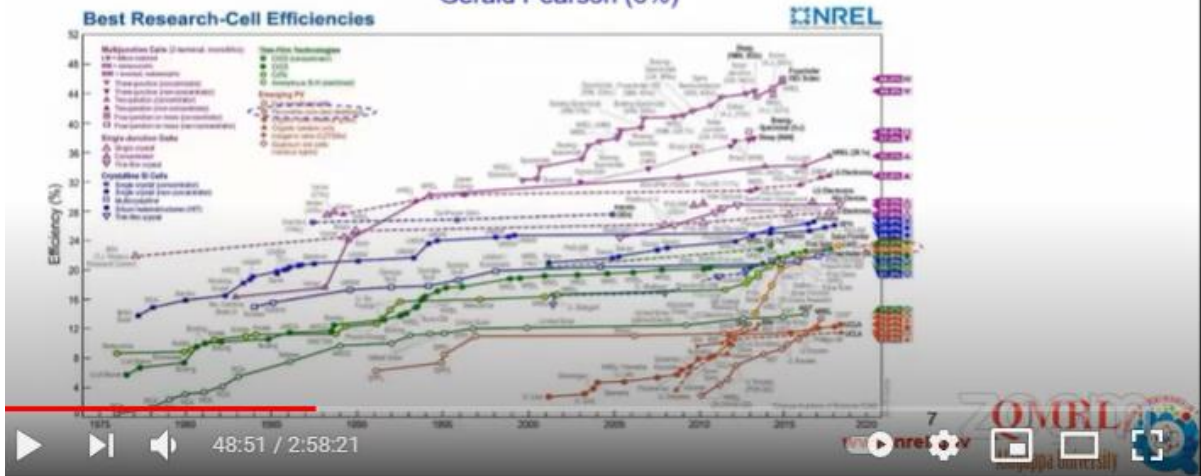
- QDSSC-Solar Cell
- QDs for NLO Applications
- 2D-Layerd Materials Energy application
- QDs for Bio Imaging Application
- Nanomaterials for Q-LEDs

44:03 / 2:58:21

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

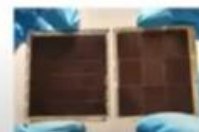
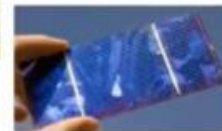
## History of solar cells

- Photovoltaic effect : 1839 by A.H. Becquerel
- First solid state solar cell : 1883 by Charles Fritts (1%)
- First c-Si solar cell : 1940 by Russell Ohl (1%)
- Respectable c-Si solar cell : 1954 by Daryl Chapin, Calvin Souther and Gerald Pearson (6%)



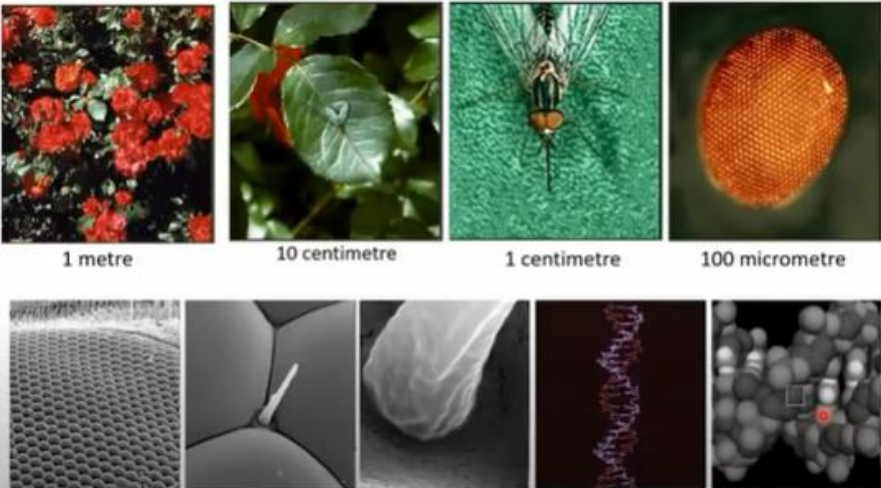
## Evolution of Solar Cells

- **First Generation**
  - Single crystalline silicon wafers (c-Si)
- **Second Generation**
  - Amorphous Silicon (a-Si)
  - Polycrystalline Silicon (poly-Si)
  - Cadmium Telluride (CdTe)
  - Copper Indium Gallium Diselenide (CIGS) alloy
- **Third Generation**
  - Dye Sensitized solar cells (DSSC)
  - Quantum Dot Sensitized Solar Cells (QDSSC)
  - Perovskite Solar Cells (PSC)
  - Organic Solar Cells (OSC)



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

### Understanding Size

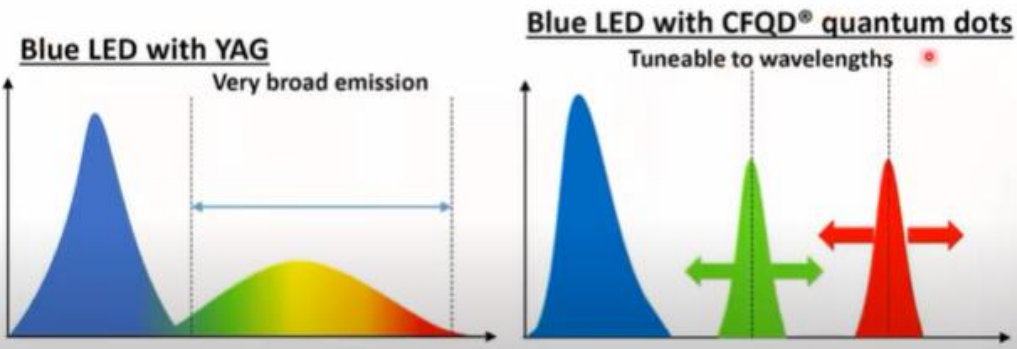


The image displays a grid of nine images illustrating different scales of size, from macroscopic to nanoscopic. The scales are labeled below each image:

- 1 metre: A cluster of red flowers.
- 10 centimetre: A green leaf.
- 1 centimetre: A fly on a green surface.
- 100 micrometre: A textured orange surface.
- 10 micrometre: A grid of small circular structures.
- 1 micrometre: A close-up of a crystal structure.
- 100 nanometre: A close-up of a textured surface.
- 10 nanometre: A DNA double helix structure.
- 1 nanometre: A cluster of small particles.

1:03:34 / 2:58:21

### Tuneable wavelength

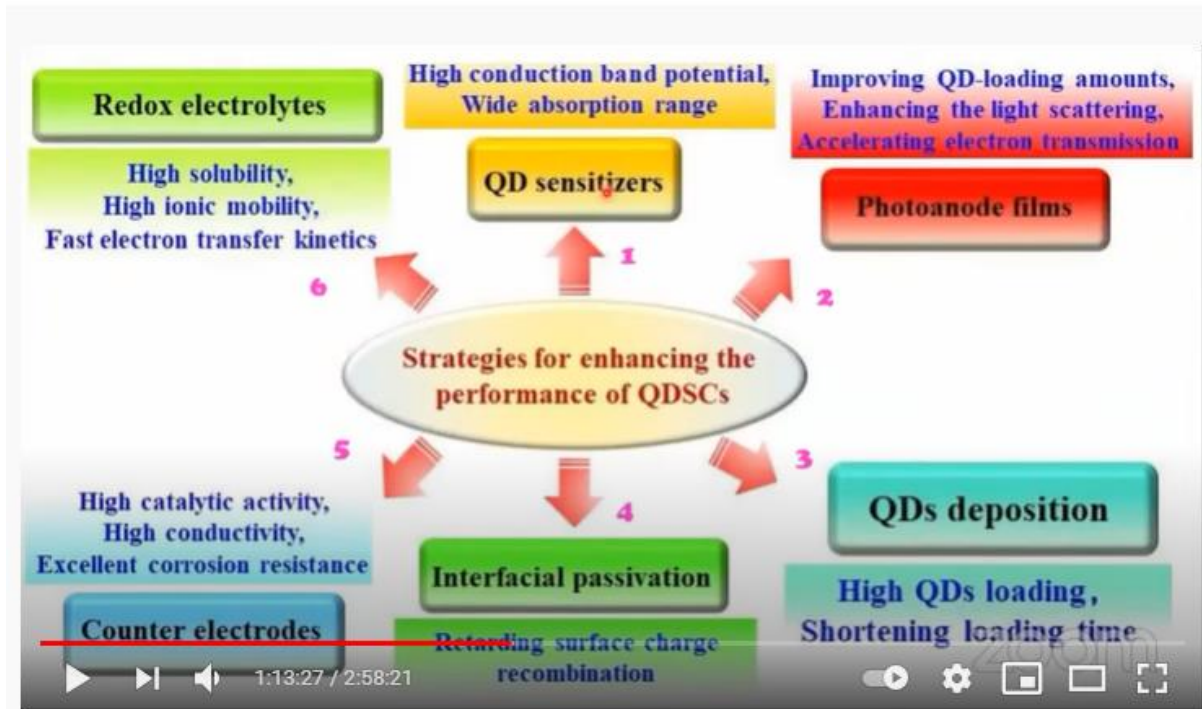


The image shows two graphs comparing emission spectra:

- Blue LED with YAG:** Shows a very broad emission spectrum, labeled "Very broad emission".
- Blue LED with CFQD<sup>®</sup> quantum dots:** Shows a narrow emission spectrum, labeled "Tuneable to wavelengths". The spectrum is shown in blue, green, and red, indicating tunability to different wavelengths.

1:08:53 / 2:58:21

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



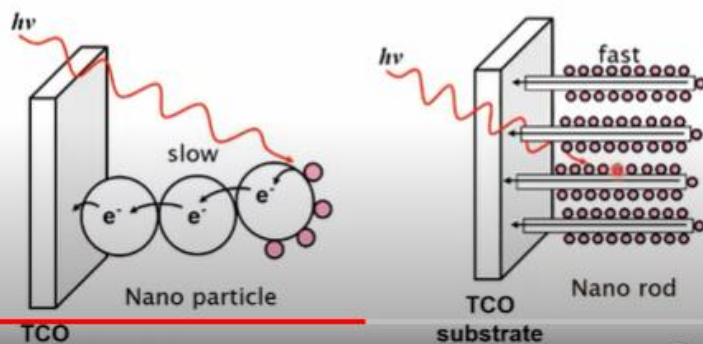
(c) Hybrid nanostructure (ion-doped, composite)

|  |  |  |      |       |      |        |
|--|--|--|------|-------|------|--------|
| ZnO/RGO                                | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -<br>Cu <sub>2</sub> S/brass | 0.57 | 8.72  | 0.44 | 2.19   |
| TiO <sub>2</sub> /RGO                  | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -<br>Cu <sub>2</sub> S/brass | 0.57 | 12.38 | 0.57 | 4.02   |
| TiO <sub>2</sub> / Graphene frameworks | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -Pt                          | 0.58 | 15.89 | 0.46 | 4.24 ▲ |
| N-TiO <sub>2</sub> NPs                 | CdSe <sub>0.9</sub> S <sub>0.1</sub> /CdSe | $S_n^{2-}/S^{2-}$ -Pt                          | 0.47 | 12.03 | 0.64 | 3.62   |
| HF-TiO <sub>2</sub> NPs                | CdSe                                       | $S_n^{2-}/S^{2-}$ -<br>Cu <sub>2</sub> S/brass | 0.55 | 12.05 | 0.57 | 3.78   |
| Zn <sub>1-x</sub> TiO <sub>2</sub> NPs | CdS  | $S_n^{2-}/S^{2-}$ -Au                          | 0.58 | 10.00 | 0.41 | 2.38   |
| Cu <sub>2</sub> ZnO NPs                | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -<br>Cu <sub>2</sub> S/brass | 0.62 | 9.87  | 0.43 | 2.63   |
| B-S-TiO <sub>2</sub> NPs               | CdS  | modified $S_n^{2-}/S^{2-}$ -<br>NiS            | 1.22 | 3.35  | 0.88 | 3.60   |
| Al-ZnO nanorods                        | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -CuS/PbS                     | 0.60 | 14.76 | 0.35 | 3.10   |
| Y-ZnO nanorods                         | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -CuS                         | 0.60 | 13.37 | 0.41 | 3.29   |
| TiO <sub>2</sub> nanorods              | CdS/CdSe                                   | $S_n^{2-}/S^{2-}$ -Cu <sub>2</sub> S           | 0.51 | 13.64 | 0.44 | 3.06   |

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## 1D metal oxide photoanode

- Vertically aligned 1D metal oxide nanostructures - No interparticle grain boundary
- High electron mobility  $\text{SnO}_2$  ( $100\sim 200\text{ cm}^2\text{V}^{-1}\text{S}^{-1}$ ) or  $\text{ZnSnO}_4$  ( $10\sim 100\text{ cm}^2\text{V}^{-1}\text{S}^{-1}$ ) photoanodes might be useful -  $e^-$  mobility in  $\text{TiO}_2$ :  $0.1\sim 100\text{ cm}^2\text{V}^{-1}\text{S}^{-1}$



1:25:07 / 2:58:21



Zoom Meeting

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**

***ABSTRACT/FULL PAPER***

**“Development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation & IR detector applications”**

**Muthu Senthil Pandian**

SSN Research Centre, SSN Institutions, Chennai-603110, Tamil Nadu

\*E-mail: [senthilpandianm@ssn.edu.in](mailto:senthilpandianm@ssn.edu.in)

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Abstract

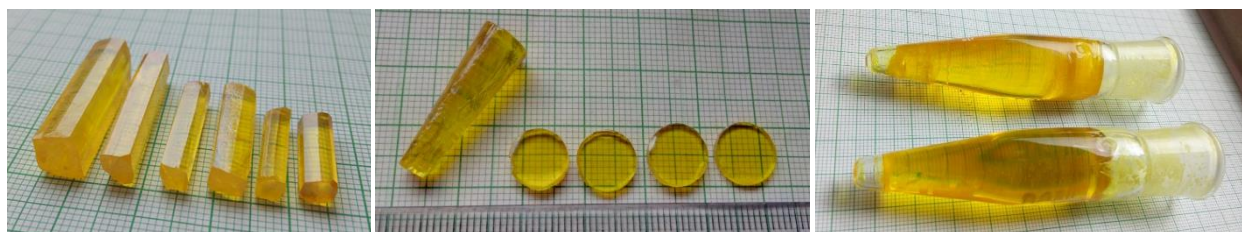
### Development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation & IR detector applications

Muthu Senthil Pandian\*, P. Ramasamy

SSN Research Centre, SSN Institutions, Chennai-603110, Tamil Nadu

\*E-mail: [senthilpandianm@ssn.edu.in](mailto:senthilpandianm@ssn.edu.in)

Gravity driven concentration gradient is used in the uniaxially solution-crystallization method of Sankaranarayanan-Ramasamy (SR). TGS, GPI, KAP, SSDH, DGZCD, DGBCM, benzophenone and many more crystals have been successfully grown by SR method. Longest benzophenone crystal having dimension of 1350 mm length and 55 mm diameter was grown for the first time in solution growth by SR method. Starting with a thin plate as seed a large size crystal can be grown. The physical properties and crystalline perfection of the SR method grown crystal is normally superior to the conventional method grown crystals. The quality of the SR method grown crystals has been improved by several modifications made in SR method. The impurity segregation cannot be avoided in the existing SR method. So we planned to introduce the RSR method for growing good quality, unidirectional single crystals. The effect of rotation on unidirectional crystal growth method (Rotational Sankaranarayanan - Ramasamy (RSR)) has been proposed for the first time. The organic nonlinear optical 2-Aminopyridinium 4-nitrophenolate 4-nitrophenol (2APNP) crystals have been grown by (i) conventional slow evaporation, (ii) Sankaranarayanan-Ramasamy (SR) method and Rotational SR (RSR) method. The grown 2APNP crystals were subjected to various studies like HRXRD, laser damage threshold, chemical etching, Vickers microhardness, birefringence, UV-Vis NIR, dielectrics and piezoelectrics. The Rotational Sankaranarayanan-Ramasamy (RSR) method grown crystals show excellent optical, mechanical, dielectric and piezoelectric behavior and higher laser damage threshold capability compared to the conventional and normal SR method grown crystals. HRXRD and etching studies showed that the quality of the RSR method grown crystal is better than conventional and normal SR method grown crystal. The Rotational Sankaranarayanan-Ramasamy (RSR) method can be used to grow single crystals along a specific crystallographic direction such as the phase matching direction in nonlinear optical (NLO) crystals. The unidirectional crystal growth method is ideally suited for crystal growth along this direction to obtain large size crystals required for obtaining SHG elements with minimum wastage. In addition, the unidirectional solution crystallization usually occurs at around room temperature; much lower thermal stress is expected in these crystals over those grown at high temperatures. Successful development of this unidirectional method will provide the technology to produce crystals at a yield close to 100% and easy scaling-up process.



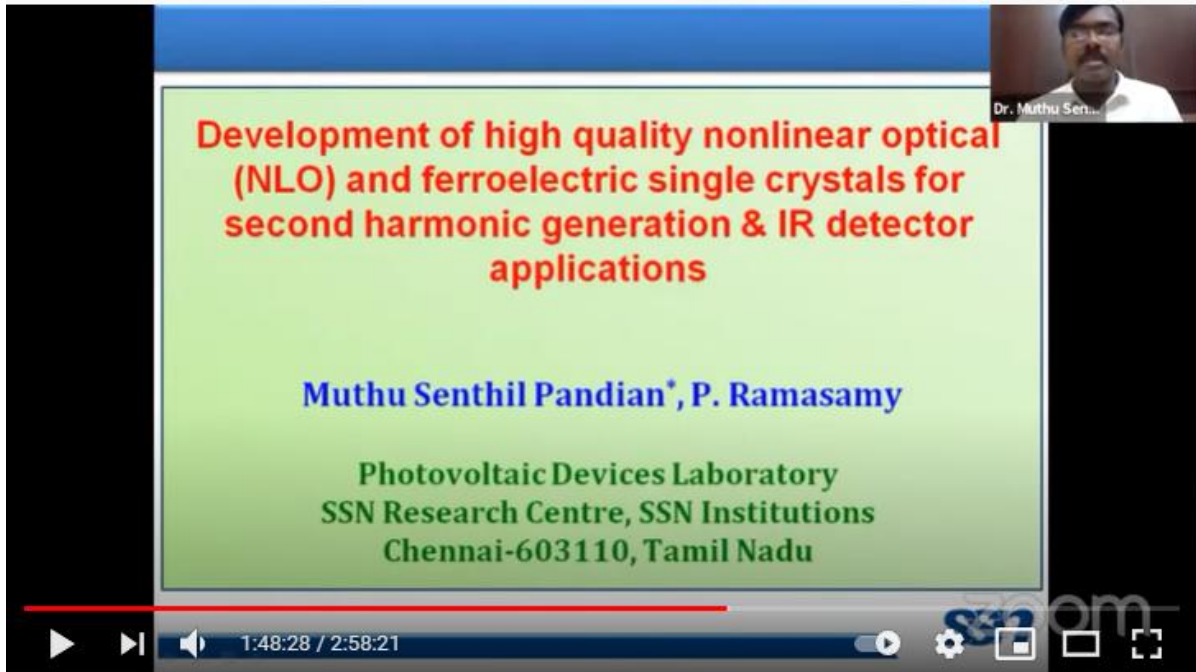
2AP4N crystals grown by (a) Conventional method, (b) SR method and (c) RSR method

## References

- [1] X. Luo, S. Pan, X. Fan, J. Wang and G. Liu, *J. Cryst. Growth*, **2009**, **311**, 3517-3521.
- [2] P. Karuppasamy, Muthu Senthil Pandian, P. Ramasamy, Sunil Verma, *Opt. Mater.* **2018**, **79**, 152-171.

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Full Paper



Dr. Muthu Sen...

**Development of high quality nonlinear optical (NLO) and ferroelectric single crystals for second harmonic generation & IR detector applications**

**Muthu Senthil Pandian\*, P. Ramasamy**

**Photovoltaic Devices Laboratory  
SSN Research Centre, SSN Institutions  
Chennai-603110, Tamil Nadu**

1:48:28 / 2:58:21



Dr. Muthu Sen...



**Applications:**

- ❖ Lasers
- ❖ Nonlinear Optics (NLO)
- ❖ Light Emitting Diodes (LED)
- ❖ Pyroelectric Detectors
- ❖ Optical Components



1:50:14 / 2:58:21



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Selection of Seed Crystal and Mounting

The diagram illustrates the process of selecting a seed crystal and mounting it. On the left, a large, faceted crystal is labeled "TGS seed". A small blue seed crystal is shown being placed on a "(010) Plate". Green arrows indicate the direction of growth or mounting. To the right, a vertical plate with horizontal dashed lines is shown, and a final "Crystal" is shown mounted on a substrate.

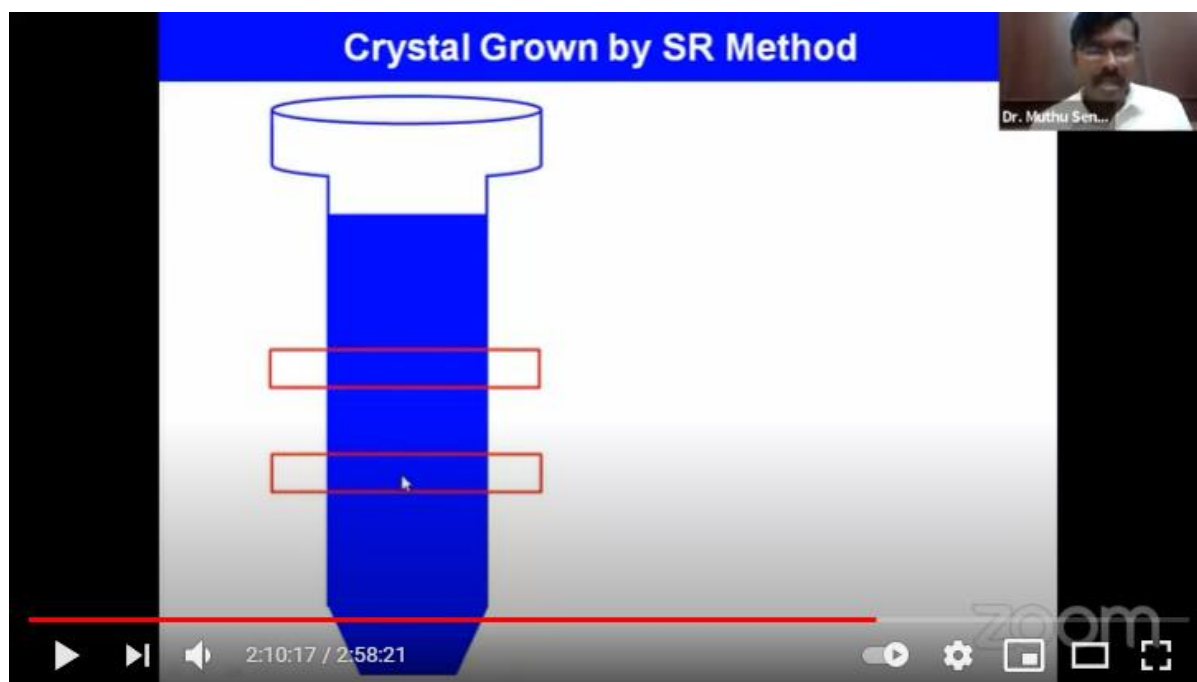
2:05:43 / 2:58:21

## Length to breadth ratio can be varied at will with a Stoichiometric Solution

The diagram compares two crystal growth methods. On the left, two identical cylindrical vessels are shown. The middle vessel contains a blue rod labeled "Conventional". The right vessel contains a blue rod labeled "SR" (Stoichiometric Ratio), which is significantly longer than the conventional rod. A ruler is placed next to the SR rod for scale. An inset image shows a 3D model of a crystal with a yellow arrow pointing to the SR rod.

2:12:19 / 2:58:21

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

Easily we can find out the growth rate along any plane

**L-lysine Mono Hydrochloride Dihydrate (L-LMHCl) single crystal**



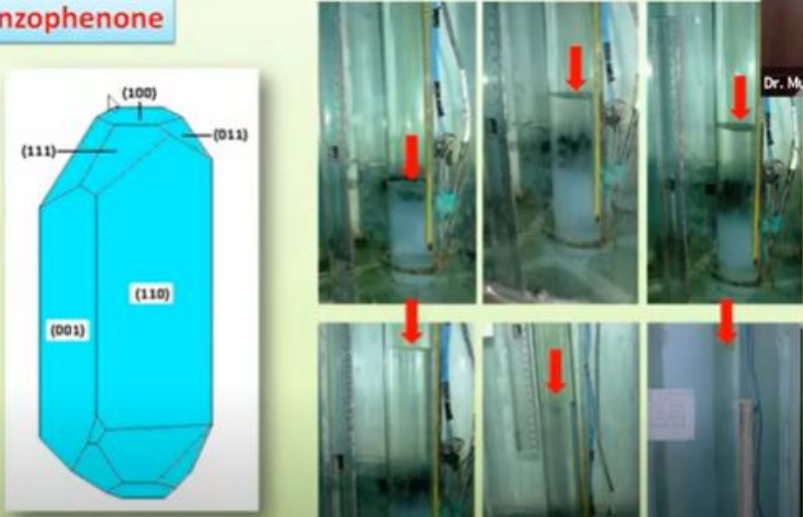
1 mm      1 mm      1 mm      2 mm

The growth rate along  $\langle 0\ 1\ \bar{1} \rangle$ ,  $\langle 0\ 1\ 1 \rangle$ ,  $\langle 0\ 1\ \bar{1} \rangle$ ,  $\langle 1\ 0\ 0 \rangle$  orientations was studied.

Dr. Muthu Sen...

2:07:14 / 2:58:21

**Benzophenone**



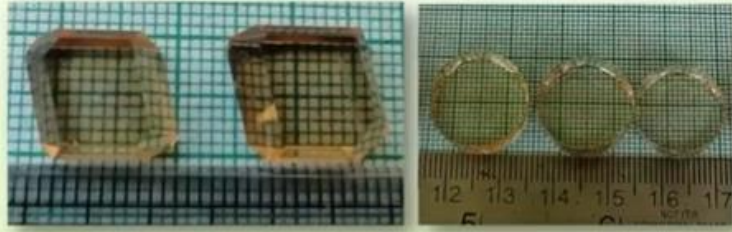
Different growth stages of unidirectional grown BP crystal

Dr. Muthu Sen...

2:17:38 / 2:58:21

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

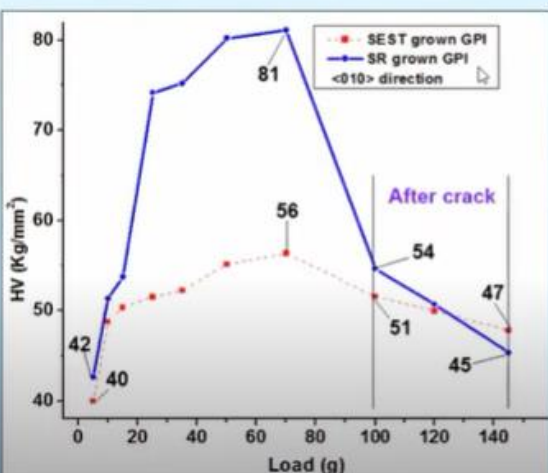
## Characterization Measurements



- ▶ Samples were prepared with the identical thickness.
- ▶ The surface damage is affected by the energy absorbing defects such as **strains, scratches and polishing contaminants** which influence the physical properties strongly. Therefore the experiments are performed on the highly polished crystals thus minimizing any surface defects.
- ▶ In order to confirm the reproducibility, every characterization was repeated several times and the similar results have been observed.

2:24:29 / 2:58:21

## Glycine Phosphite (GPI)



| Load (g) | SEST grown GPI HV (Kg/mm <sup>2</sup> ) | SR grown GPI HV (Kg/mm <sup>2</sup> ) |
|----------|---|---------------------------------------|
| 0        | 42                                      | 42                                    |
| 10       | 40                                      | 40                                    |
| 20       | 50                                      | 50                                    |
| 30       | 51                                      | 74                                    |
| 40       | 52                                      | 75                                    |
| 50       | 54                                      | 80                                    |
| 60       | 55                                      | 81                                    |
| 70       | 56                                      | 81                                    |
| 100      | 51                                      | 54                                    |
| 120      | 50                                      | 50                                    |
| 140      | 47                                      | 45                                    |

Indentation time- 15 s

$$H_v = (1.854) P / d^2 \text{ kg / mm}^2$$

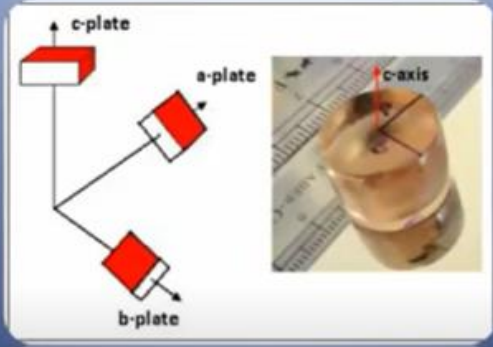
Leitz-Wetzler microhardness tester

70 gm induces cracks

2:29:34 / 2:58:21

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Dielectric Tensor for Orthorhombic SSDH Crystal



The dielectric tensor for SSDH single crystal was determined as a function of temperature at 1 kHz frequency along a-, b- and c-directions. The observed ranges of  $\epsilon_{11}$ ,  $\epsilon_{22}$  and  $\epsilon_{33}$  values are 12.2-6.3, 9.3-4.1 and 8.5-4.7 respectively.

Dr. Muthu Sen...

2:33:22 / 2:58:21

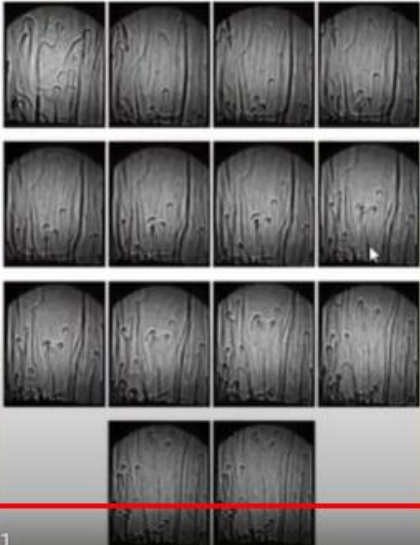


Dr. Muthu Sen...

2:20:26 / 2:58:21

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

Shadowgraph images showing fluid movement in the form of plumes (Stage



1 hour

Dr. Muthu Sen...

2:37:56 / 2:58:21

zoom

### Crystal Growth by the Modified SR Method



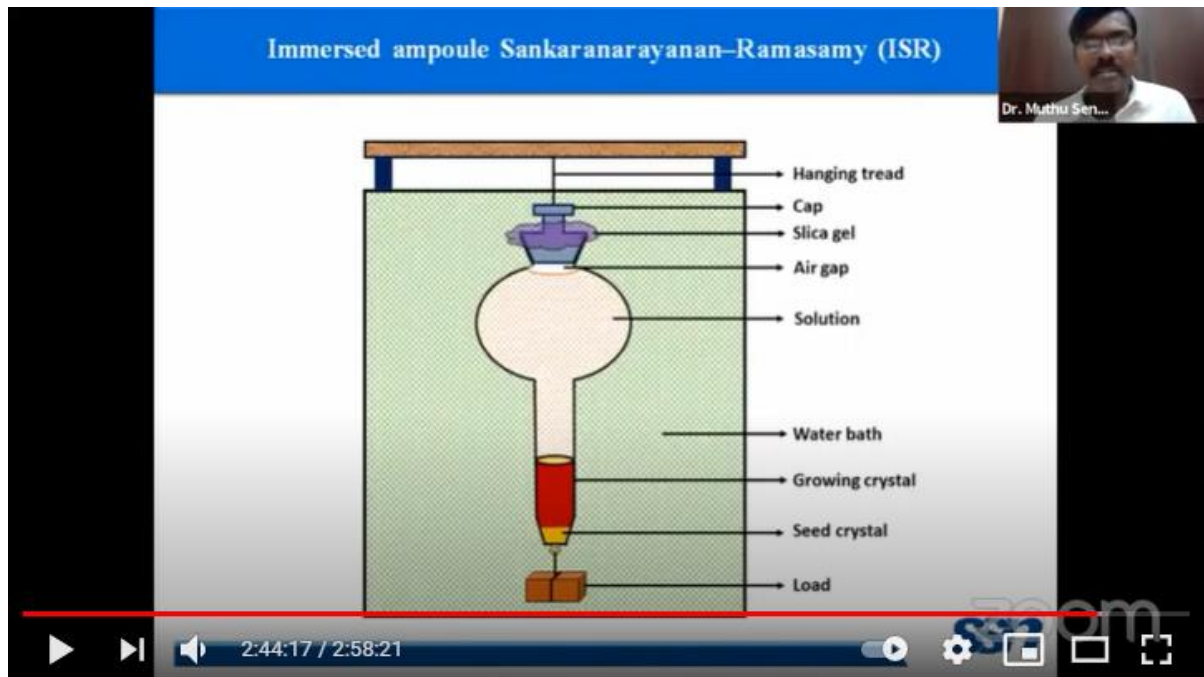
- > Optimized cooling rate : 0.01 °C/hour
- > Optimized temperature range : 50-35°C
- > Solvent - Methanol

Dr. Muthu Sen...

2:41:14 / 2:58:21

zoom

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021





**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***PARTICIPANTS LIST***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## List of Participants:

The number of participants for registrations was **306** from different organizations.

| S.No | Full Name                     | Organization   |
|------|-------------------------------|--|
| 1    | Dinesh Gopal Dommeti          | Adikavi Nannaya University   |
| 2    | Dedeepya.Dommeti              | Tirumala   |
| 3    | Singam prasad                 | Aknu   |
| 4    | Poojitha sri gowri Rallapalli | Adhikavi nannaya University  |
| 5    | Pampana Hema Durga Jyothi     | Adikavi Nannaya University   |
| 6    | Siriki. Divya Devi Ramya Sri  | Adikavi nannaya university   |
| 7    | Dasam.venkata ramalakshmi     | Adhikavi nannaya University  |
| 8    | Nakka.Divya Bhanu             | Adikavi nannaya University, Rajamundry   |
| 9    | Kopanathi komali              | Adikavi nannaya University   |
| 10   | Yarra vijaya manga lakshmi    | Adikavi nannaya university   |
| 11   | K. BHARATHI                   | Idhaya College for Women, Kumbakonam   |
| 12   | Dr. S I SRIKRISHNA RAMYA      | SIVET COLLEGE GOWRIVAKKAM  |
| 13   | Ranjithkumar B                | Sri Ranganathar Institute Of Engineering And Technology                              |
| 14   | Dr.R.Kesavasamy               | Sri Ramakrishna Engineering College  |
| 15   | Dr.Gaddam.Ramesh              | University P.G College (Satavahana University)                                       |
| 16   | M Ragam                       | Fatima College   |
| 17   | Dr B SATHYASEELAN             | University College of Engineering Arni-Anna University                               |
| 18   | Dr SenthilKannan K            | Edayathangudy G S Pillay Arts and Science College Nagapattinam                       |
| 19   | Dr Krishnakumar Muthusamy     | Anna University College of Engineering-Dindigul                                      |
| 20   | Dr.Deepannita Chakraborty     | Dr.N.G.P. Arts and Science College   |
| 21   | Dr.N.Ramjeyanthi              | PSN College of Engineering & Technolgy   |
| 22   | Dr.M.Murugan                  | SRM Valliammai Engineering College   |
| 23   | Vinitha G                     | Vellore institute of Technology, Chennai   |
| 24   | R. JAGADEESH                  | Sastra University  |
| 25   | Dr. V. BASKARAN               | Periyar Maniammai Institute of Science and Technology, Vallam, Thanjavur             |
| 26   | SUMATHI P                     | St.Antony's College of Arts and Sciences for Women                                   |
| 27   | S.MURUGESAN                   | VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN(AUTONOMOUS), TIRUCHENGODE-637205 |
| 28   | V.Dhivya                      | K.S.Rangasamy College of Arts and Science (Autonomous)                               |

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|    |                              |  |
|----|------------------------------|--|
| 29 | Dr. M. KARUNAKARAN           | Alagappa Government Arts College, Karaikudi                                      |
| 30 | VANITHA V                    | Periyar EVR College (Autonomous)   |
| 31 | Dr. J. THIRUPATHY            | KARPAGAM ACADEMY OF HIGHER EDUCATION   |
| 32 | Dr. D. PRAKASH               | Hindusthan Institute of Technology   |
| 33 | PORIA KISHORKUMAR C          | VEER NARMAD SOUTH GUJARAT UNIVERSITY,SURAT                                       |
| 34 | VAISNAVI D                   | K.S.Rangasamy College Of Arts and Science  |
| 35 | Mohanraj k                   | SRM - IST, Ramapuram, Chennai  |
| 36 | Dr M Parthasarathy           | VISTAS CHENNAI   |
| 37 | Mr. C. Ravi                  | Vivekanandha college of Arts and Science for women autonomous                    |
| 38 | K. Divya                     | St. Joseph's College, Tiruchirappalli  |
| 39 | SINDHU TILAK                 | Siddaganga Institute of Technology   |
| 40 | INDHUMATHI. N                | FDP  |
| 41 | M L N Madhu Mohan            | Bannari Amman Institute of Technology  |
| 42 | Dr. DEEPA JANANAKUMAR        | VELALAR COLLEGE OF ENGINEERING AND TECHNOLOGY                                    |
| 43 | Dr.S.Rizwana Begum           | Seethalakshmi Ramaswami College (Autonomous), Trichy-2.                          |
| 44 | Dr. N. Srinivasan Arunsankar | Sri Sai Ram Engineering College  |
| 45 | Dr. N. KANAGATHARA           | Saveetha School of Engineering, SIMATS   |
| 46 | Kavitha N                    | MIT Campus, Anna University, Chennai   |
| 47 | Dr.A.VENKATRAJ               | Dr.N.G.P. INSTITUTE OF TECHNOLOGY  |
| 48 | PRITHIKA.P                   | VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN ( AUTONOMOUS) ELAYAMPALAYAM. |
| 49 | Vinay parol                  | Sahyadri science college shimoga   |
| 50 | DEVI.N                       | K.S.R COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)                                   |
| 51 | Akhin V P                    | Anna University  |
| 52 | Mr. J. RAJA                  | VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN                              |
| 53 | Nivetha Govindan             | Ksrcas   |
| 54 | T V BANUMATHI                | SRI GVG VISALAKSHI COLLEGE FOR WOMEN   |
| 55 | NAGHMA KHAN                  | National Physical Laboratory   |
| 56 | P. M. RAM SRI NIVAS          | University College of Engineering  |
| 57 | Dr.R.Senthil Kumar           | Vivekanandha College of Arts and Sciences for Women (Autonomous)                 |
| 58 | Nisitha R                    | vivekanandha college of arts and sciences for women                              |
| 59 | R.MOHANA PRIYA               | K.S.R College of Arts and Science (Autonomous)                                   |
| 60 | Akhileshwari P               | University of Mysore   |
| 61 | Dr. Hemaraju B C             | Malnad College of Engineering  |
| 62 | Kalaiarasan M                | SRM IST, KTR   |
| 63 | H. R. Pratheep               | Kongunadu arts and science college coimbatore                                    |
| 64 | SURESH K                     | ANNAI MIRA COLLEGE OF ENGINEERING AND TECHNOLOGY, vellore                        |
| 65 | RAMESH. P                    | Nehru Memorial College, Puthanampatti  |
| 66 | Subha.R                      | Vivekanandha college of arts and sciences for women,Autonomous.                  |
| 67 | Dr.KS Kiran                  | Jain Deemed to be university   |
| 68 | Dr. Ganesh G                 | EXCEL ENGINEERING COLLEGE, KOMARAPALAYAM   |
| 69 | A. Subashini                 | Srimad Andavan Arts and Science College  |
| 70 | S BALAMURALI                 | HINDUSTHAN COLLEGE OF ENGINEERING & TECHNOLOGY                                   |
| 71 | Syed Arshad Hussain          | Tripura University (A Central University)  |
| 72 | shahnaz kossar               | B.S Abdur Rahman Crescent Institute of science and technology Vandalur Chennai   |
| 73 | Kirthika. V                  | St. Antonys college of arts and sciences for women.                              |
| 74 | Dr.S.Sivaranjani             | St.Antony's College of Arts and Sciences for Women, Dindigul                     |
| 75 | P.M.RAVI KUMAR               | SRI GOVINDARAJASWAMY ARTS COLLEGE, TTD, TIRUPATI                                 |
| 76 | Dr.R.Subramaniyan @ Raja     | KPR Institute of Engineering and Technology                                      |

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|     |                           |  |
|-----|---------------------------|--|
| 77  | Dr.G. Pradeesh            | PPG INSTITUTE OF TECHNOLOGY  |
| 78  | Dr.M.Sureshkumar          | Vels Institute of Science Technology and Advanced Studies                  |
| 79  | DR. SARITHA PENDLIKATLA   | Sgs arts college ,tirupati   |
| 80  | K. JAYAMOORTHY            | St. Joseph's College of Engineering  |
| 81  | Ms. M. Dhivya Angelin     | National College   |
| 82  | VIGNESH V                 | SSN engineering college, Chennai   |
| 83  | Dr.Sudhir M.Hiremath      | KLE J.T.College Gadag  |
| 84  | Dr. K. Anandan            | AMET Deemed to be University, ECR, Chennai - 603 112.                      |
| 85  | Dr. Balwinder Kaur        | Govt Degree College R S Pura Jammu   |
| 86  | Dr. K. Sampath            | Kumaraguru College of Technology   |
| 87  | L. Milka Pauli            | FDP- Faculty Development programme   |
| 88  | Dr. M. Gowrishankar       | Sri Venkateswara college of Engineering and Technology                     |
| 89  | Dr.K.Suguna               | Sri Sarada College for women (Autonomous),Salem                            |
| 90  | PRASHANT KUMAR            | CSIR-NATIONAL PHYSICAL LABORATORY NEW DELHI                                |
| 91  | Veldevi                   | VISTAS   |
| 92  | R PUNITHAPRIYA            | nss  |
| 93  | Dr.P.BALARAMESH           | R.M.K.ENGINEERING COLLEGE  |
| 94  | Dr. syeed Asad Ali        | Aligarh Muslim University, Aligarh   |
| 95  | Dr. K. BALAMURUGAN        | National Institute of Technology Puducherry, Karaikal.                     |
| 96  | Santosh Kumar Tripathi    | Mahatma Gandhi Central University  |
| 97  | Dr.S. Esakki Muthu        | Karpagam Academy of Higher Education                                       |
| 98  | R. Ramesh                 | Sacred Heart College (Autonomous) ,Tirupattur                              |
| 99  | Dr.G.Ramalingam           | ALAGAPPA UNIVERSITY  |
| 100 | N. Madhavan               | Sacred Heart College -tpt  |
| 101 | Dr.C.SUDHAKAR             | Mahendra Arts and Science College (Autonomous)                             |
| 102 | K Nagalakshmi             | Government college autonomous,rjy  |
| 103 | T. Vijaya Deepika         | Adi kavi nannayya university   |
| 104 | Dr. Sophia Rani.I         | Bharat Institute of Engineering and Technology                             |
| 105 | JOYCE JOSEPH              | Saurashtra University  |
| 106 | SELVA KUMAR R             | Mahendra Arts and Science College  |
| 107 | Dr. S. Gnanam             | Vels Institute of Science, Technology & Advanced Studies (VISTAS)          |
| 108 | Dr. R. Sudha              | Vistas   |
| 109 | Mekala R                  | Narasu's Sarathy Institute of Technology                                   |
| 110 | Mrs.A.SUREKHA             | S.V.ARTS COLLEGE TTD TIRUPATI  |
| 111 | Dr. Chetan Sharma         | Govt. Degree College R.S.Pura  |
| 112 | DHARMARPU VIJAY           | D.N.R. College (A), Bhimavaram, W.G.                                       |
| 113 | Pasupuleti Rajeswari      | Adikavi nannaya University   |
| 114 | Srivani Gowru             | Banasthali university  |
| 115 | Mr. S. ALAGURAJA          | THIAGARAJAR COLLEGE, MADURAI-9   |
| 116 | Dr. S. SENTHIL            | GOVERNMENT ARTS COLLEGE FOR MEN, NANDANAM, CHENNAI                         |
| 117 | PATNAYAKUNI TULASIRAO     | SRM AP   |
| 118 | Gudise Anuhya             | Acharya Nagarjuna University   |
| 119 | AARTHI G                  | K.Ramakrishnan College of Engineering,Trichy                               |
| 120 | Mahatta Oza               | Saurashtra University  |
| 121 | Shaik Najirunnisa         | VSLakshmi women's degree and pg college                                    |
| 122 | KUNA SRIHARI RAO          | D.R.GOWENKA WOMENS DEGREE COLLEGE , TADEPALLIGUDEM                         |
| 123 | Miriyala. Naga Suneetha   | V S Lakshmi women's degree and PG college, kakinada                        |
| 124 | Dr. V.Mallipriya          | Adikavi Nannaya University   |
| 125 | BETHA VEERA VAMSI KRISHNA | Adikavi Nannaya University   |
| 126 | S. Sugarthi               | SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India |
| 127 | Dr Girija K               | Dr. N.G.P. Arts and Science College  |
| 128 | Dr.G.Nithya               | Vels Institute of Science, Technology and Advanced Studies                 |
| 129 | Meesala chandini          | Dr.Br ambedkhar University   |
| 130 | Dr.PYDALA SUGUNA          | SGSARTS COLLEGE,TTD TIRUPATI   |
| 131 | Dr. S.Sharmila            | Karpagam Academy of Higher Education                                       |

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|     |                                     |  |
|-----|-------------------------------------|--|
| 132 | N.Priyadharsini                     | Dr.NGP Arts and science college                              |
| 133 | Dr.K.Parimala                       | Nehru Memorial College at Trichy                             |
| 134 | Dr. T K Visweswara Rao              | SVD GDC (W), Nidadavole                                      |
| 135 | Dr. G. Emerson Robin                | John Dewey Group Of Schools                                  |
| 136 | Nagam Pavankumar                    | Junior lecture   |
| 137 | Vadivel G                           | K.S.Rangasamy college of arts and science(autonomous)        |
| 138 | Dr N Rajeswari Yogamalar            | Hindustan Institute of Technology and Science                |
| 139 | Dr. N. MANICKAM                     | BHARATHIDASAN UNIVERSITY                                     |
| 140 | B. Kapil kumar                      | K. S. Rangasamy college of arts and science                  |
| 141 | B.sony                              | Nannaya university   |
| 142 | Vanitha B                           | Government higher secondary School                           |
| 143 | Dr.A.Jagadesan                      | R.M.K Engineering College                                    |
| 144 | SOUNDARYA. S                        | Ksr college of arts and science (autonomous)                 |
| 145 | MURALI KRISHNA HARI                 | ADITYA DEGREE COLLEGE FOR WOMEN, KAKINADA                    |
| 146 | PREEDA P                            | NOORUL ISLAM CENTRE FOR HIGHER EDUCATION                     |
| 147 | J. RAJA                             | VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN          |
| 148 | MADDI USHA.                         | SPW D&PG College,TTD,Tirupati                                |
| 149 | Dr. N. Aarthi                       | PSGR Krishnammal College for Women, Coimbatore               |
| 150 | Dr.S.Nazarath Begum                 | Sadakathullah Appa College-Tirunelveli                       |
| 151 | Dr. D. SHAKILA                      | D.K.M. College for women (Autonomous), Vellore               |
| 152 | D.THILAGA SUNDARI                   | The M.D.T.Hindu College, Tirunelveli                         |
| 153 | Gokada Manikanta Sravani            | Andhra university  |
| 154 | J. Nachammai                        | Alagappa Govt Arts College                                   |
| 155 | S. LINGESWARI                       | ST.JOSEPH'S COLLEGE, TRICHY                                  |
| 156 | Dr.N.Jeevanantham                   | P.S.G College of Arts & Science                              |
| 157 | Dr.M.Amalanathan                    | Nanjil Catholic College of Arts and Science, Kaliyakkavilai  |
| 158 | Dr.A.Venkata Ramanamma              | SGS Arts College,TTD,Tirupati                                |
| 159 | Ghodke Pankaj Dnyanoba              | Maharashtra Institute of Technology, Auragabad, Maharashtra. |
| 160 | R.RAMALAKSHMI                       | St.Peter's Institute of Higher Education and Research        |
| 161 | I.Prithivi Raj                      | SIVET COLLEGE, Chennai-73                                    |
| 162 | Dr.P.Malliga                        | Sathyabama Institute of Science and Technology               |
| 163 | Dr. Saintha Jostar.T                | Sadakathullah Appa College                                   |
| 164 | SUBA. A                             | Pope's college, Sawyerpuram                                  |
| 165 | Dr.M.Gopalakrishna                  | Adikavi nannaya university                                   |
| 166 | Sevanthi.M                          | Faculty development program                                  |
| 167 | Dr. R. Prabakarar Krishnan          | SCSVMV (Deemed to be University)                             |
| 168 | Thangabalu S                        | Kongunadu Arts and Science College                           |
| 169 | Dr. Annavarapu Lavanya Kumari       | Adikavi Nannaya University                                   |
| 170 | KANCHARLA AJAY KUMAR                | GDC AVANIGADDA   |
| 171 | Dr CH MURALI KRISHNA                | Adikavi Nannaya University                                   |
| 172 | Prabakaran.s                        | Sathyabama Institute of science and technology               |
| 173 | A. Dhandapani                       | CK College of Engineering & Technology                       |
| 174 | Dr. G. Keerti Marita                | Adukavi Nannaya University                                   |
| 175 | Avupati Venkata Surya Satyanarayana | AP   |
| 176 | Rehna P                             | Kongunadu Arts and Science College                           |
| 177 | Sekhar pandrinki                    | A.K.N.U Campus TadepalliGudam                                |
| 178 | Dr. Nidhi                           | GDC, AKHNOOR   |
| 179 | Dr. R. Kumuthini                    | Sadakathullah Appa College, Tirunelveli.                     |
| 180 | Dr. T. Sujatha                      | SIVET College Government Aided                               |
| 181 | Dr. M. Nagarjuna                    | Dhanekula institute of Engineering and Technology, ganguru   |
| 182 | Dr.T.Kamakshi                       | Mallareddy Engineering College For Women                     |
| 183 | Raseel Rahman MK                    | Jamia Millia Islamia, New Delhi-110025                       |
| 184 | K BHARANIDHARAN                     | VIT CHENNAI  |
| 185 | Dr.M.V.Ramachandra Rao              | Mother Teresa institute of science and Technology            |
| 186 | Dr.D.Jaishree                       | Sri Ramakrishna Institute of Technology                      |
| 187 | Dr N.Narasimha Rao                  | Krishna University   |

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|     |                                 |  |
|-----|---------------------------------|--|
| 188 | MURUGESAN NAGAR                 | SETHU INSTITUTE OF TECHNOLOGY  |
| 189 | Gayathri A V                    | Holy Cross College   |
| 190 | Dr. SAMUEL TALARI               | GMR Institute of technology  |
| 191 | Dr. Nazir Ahmad Kumar           | UGC  |
| 192 | M. NOOR FATHIMA M.Sc., M.Phil., | TamilNadu  |
| 193 | G. L. Naga Sudha                | K. G. R. L Degree & P. G College(A), Bhimavaram                                  |
| 194 | G. Sheeba Sharon                | National College, Tiruchirapalli   |
| 195 | SIVARANJANI C                   | Bishop Heber College (Autonomous)  |
| 196 | SRINIDHI BHOGADI                | K.G.R.L. College (Autonomous), Bhimavaram  |
| 197 | N Maramu                        | Kakatiya institute of technology and science warangal                            |
| 198 | BAGAVATHI SENTHILKUMAR          | PSGR KRISHNAMMAL COLLEGE OF ARTS AND SCIENCE FOR WOMEN                           |
| 199 | Dr. K. Arifa banu               | Hajee Karutha Rowther Howdia College, Uthamapalayam, Theni District.             |
| 200 | DEGALA KAVYASRI                 | ANDHRA UNIVERSITY  |
| 201 | Dr. P. Senthilvalavan           | Annamalai University   |
| 202 | Volupudi.kasi Vijaya Lakshmi    | V S LAKSHMI WOMEN'S DEGREE AND PG COLLEGE  |
| 203 | K.V.B.RANJITHA                  | Adikavi Nannaya University   |
| 204 | KARTHIKA.K                      | Chikkaiah naicker college, Erode   |
| 205 | K S Dhivya                      | Research Scholar   |
| 206 | Mani A                          | Presidency college   |
| 207 | Dr.B.Vajantha                   | Agricultural Research Station, Perumallapalle, Tirupati - ANGRAU, Andhra Pradesh |
| 208 | Anusha                          | Aknu   |
| 209 | Dr.S.Rama                       | St. Joseph's College of Engineering, Chennai-119.                                |
| 210 | Dr. Nikunj Valand               | Indus University   |
| 211 | KARTHIKEYAN S                   | K.S.Rangasamy College of Arts and Science (Autonomous)                           |
| 212 | BEERAM SIVA KRISHNA             | KLR COLLEGE OF ENGINEERING AND TECHNOLOGY  |
| 213 | V. GANDHIMATHI                  | Sri karpaga polytechnic college  |
| 214 | GANGADEVI K                     | THIAGARAJAR COLLEGE, MADURAI   |
| 215 | RAYUDU.SATYA SRAVANI            | Adikavi Nannaya University   |
| 216 | SASIKALA.T                      | SRMV college of arts and science   |
| 217 | Dr. T. Thilagavathi             | Government college for women (A), Kumbakonam                                     |
| 218 | Dr. M. Rajasekar                | Sathyabama University  |
| 219 | Suresh                          | SRM. institute of science and technology   |
| 220 | Dr. D. Ramachandran             | Sathyabama Institute of Science and Technology                                   |
| 221 | Dr G Murugadoss                 | Sathyabama Institue of Science and Technology                                    |
| 222 | Dr.Sajikumar.A.C.               | Chrisian College Kattakada, Thiruvananthapuram                                   |
| 223 | J Jenis Samuel                  | Sathyabama Institute of science and technology                                   |
| 224 | Santhosh Arjunan                | research   |
| 225 | Dr. Joy Sinthiya A.S.I          | The M.d.T Hindu College, Tirunelveli   |
| 226 | S.JESSIE JANCYRANI              | Wavoo wajeetha college kayalpatnam   |
| 227 | Dr S S Syed Abuthahir           | Jamal Mohamed College (Autonomous), Tiruchirappalli-20                           |
| 228 | GERSHOM JEBARAJ.P               | ST.XAVIER'S COLLEGE, PALAYAMKOTTAI   |

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|     |                                  |  |
|-----|----------------------------------|--|
| 229 | Jayanta Hazarika                 | Pandu College  |
| 230 | Sree Sudha J                     | Sri GVG Vishalakshi College for Women  |
| 231 | E.S.S.L.Prasanthi                | Delhi public school  |
| 232 | M Sandeep Reddy                  | SGS Arts College   |
| 233 | SUNDARAVADIVELU P                | ADHI COLLEGE OF ENGINEERING AND TECHNOLOGY   |
| 234 | Rajasekaramoorthy                | Sathyabama institute of science and technology   |
| 235 | Shobha Kulshrestha               | Jiwaji University Gwalior  |
| 236 | Manova M                         | K. Ramakrishnan college of engineering   |
| 237 | VILVANATHA PRABU.A               | Muthurangam Govt.Arts College Vellore-02   |
| 238 | VISWANATHAN K                    | Sathyabama Institute of Science and Technology   |
| 239 | PULLA SIVAKUMAR                  | Government Degree College - Mandapeta  |
| 240 | GEDDA SATYANNARAYANA             | ADIKAVI NANNAYA UNIVERSITY, TADEPALLIGUEM CAMPUS   |
| 241 | ADITHIYAN.R                      | K.S.Rangasamy college of arts and science  |
| 242 | Mahalakshmi Sireesha Veduri      | University College of Science and Technology   |
| 243 | Jegatheesan A                    | VSB engineering college  |
| 244 | B. S. Seshagiri Rao              | B. V. Raju College   |
| 245 | Dr.J.Udayaseelan                 | Govt. Thirumagal Mills College, Gudiyattam   |
| 246 | M.Harini                         | Sastra University  |
| 247 | Devi parvathi janapamula         | Aknu campus tadevalligudem   |
| 248 | E. HEMALATHA                     | K. Ramakrishnan College of Engineering, Trichy   |
| 249 | D KARUNANITHY                    | Kongunadu college of Engineering and Technology Thottiam Trichy  |
| 250 | Dr.C.Lavanya                     | Vivekanandha College of Arts & Sciences for Women (Autonomous),Elayampalayam,Tiruchengode,Namakkal(Dt) |
| 251 | Rashmi Gupta                     | GHSS Keya  |
| 252 | Dr. P. SATHEESH KUMAR            | Dr. N.G.P Institute of Technology  |
| 253 | Anbu Radhika S                   | PMT College, Melaneelithanallur  |
| 254 | JITO JOSE                        | VELLORE INSTITUTE OF TECHNOLOGY  |
| 255 | B.Dhandapani                     | Sri Sivasubramaniya Nadar College of Engineering   |
| 256 | KALEPU V MALLIKARJUNA VARA KUMAR | Adikavi Nannaya University   |
| 257 | Dr. M. Saravanan                 | SRM IST, Ramapuram Campus, Chennai   |
| 258 | J PHANI KUMAR                    | B V RAJU COLLGE  |
| 259 | Dr. M Kumaresavanji              | National College (Autonomous)  |

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|     |                                |   |
|-----|--------------------------------|---|
| 260 | Dr. M. Sushmareddi             | Dr. B. R. Ambedkar University                                 |
| 261 | Ratna kumari saladhi           | GIET degree college   |
| 262 | DR. SATHYA SHEELA S.           | RV INSTITUTE OF TECHNOLOGY AND MANAGEMENT, BANGALORE          |
| 263 | Mohammad asha                  | Adikavi nannaya University                                    |
| 264 | VETSA ANUSHA                   | Adikavi Nannaya University                                    |
| 265 | Naga mounika                   | Nanomaterials   |
| 266 | Dr. Kotla Revathi              | Adikavi Nannaya University                                    |
| 267 | YASH VINAYKUMAR JOSHI          | P. G. Department of Physics, Sardar Patel University          |
| 268 | Vaishnavi Darji                | Sardar Patel University                                       |
| 269 | Venam said Devi Rama pratyusha | Adikavi nannaya university                                    |
| 270 | Nidhishree M. Suchak           | Sardar Patel University                                       |
| 271 | GORRELA SAI DURGA PRASAD       | ADIKAVI NANNAYA UNIVERSITY                                    |
| 272 | Ramya sree vatada              | Adikavi nannaya university                                    |
| 273 | Dr.Vijayakumar Sekar           | Shandong University   |
| 274 | Rasik Ahmad Parray             | Government university   |
| 275 | Kondepati supriya              | Adikavi Nannaya University                                    |
| 276 | Sidagam. Navya Devi sai        | No  |
| 277 | Lagu Surendra babu             | Adikavi nannaya University College of pharmaceutical sciences |
| 278 | KOPPIREDDI CHANDRAKALA         | Food Development Programme                                    |
| 279 | Dr. Heera Battu                | Adikavi Nannaya University College of Pharmaceutical Sciences |
| 280 | JAYANA SAI MANISHA             | ADIKAVI NANNAYA UNIVERSITY                                    |
| 281 | Gonamanda Satya Sree           | Adikavi Nannaya University                                    |
| 282 | ANCIYA S                       | The M. D. T. Hindu College, Tirunelveli-627 010.              |
| 283 | K. Dhivyapriya                 | Bishop Heber College  |
| 284 | Narla Nagendra                 | FDP   |
| 285 | C. Anzline                     | The American College, Madurai                                 |
| 286 | Angelin Steffy A               | St.Joseph's College Tiruchirappalli                           |
| 287 | P.vidhya                       | Srmv arts and science College, Coimbatore                     |
| 288 | Annamneedi Prasuna             | Adikavi Nannaya University                                    |
| 289 | Pragada sridevi                | Adikavi nannaya University                                    |
| 290 | Praveen Toraty                 | Aditya Educational Institution                                |



## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

|     |                                |   |
|-----|--------------------------------|---|
| 291 | LAKSHMANA KUMAR<br>BEZZAVARAPU | V S K DEGREE & P G COLLEGE  |
| 292 | L RENUKA                       | V.O.Chidambaram College, Tuticorin                                  |
| 293 | Prachi H. Desai                | Sardar Patel University   |
| 294 | P. Mekala                      | Ksr college of arts and science for women                           |
| 295 | Dr. R. Sharan                  | Easwari Engineering College   |
| 296 | Hiteshkumar Rameshbhai Bhoi    | Sardar Patel University   |
| 297 | Dr. Raja Shekar P V            | SR University, Warangal   |
| 298 | Dr. S. Selvaraj                | St. Joseph College of Engineering, Sriperumbudur,<br>Chennai-602117 |
| 299 | Dr.K.A.SELVAM                  | INDO-AMERICAN COLLEGE, CHEYYAR                                      |
| 300 | Dr. D Madhavi Latha            | SSD Polymers, Machilipatnam   |
| 301 | PRAVEENKUMAR V                 | Dr.N.G.P. INSTITUTE OF TECHNOLOGY                                   |
| 302 | Dr. J. DEVANATHAN              | Indo-American College   |
| 303 | Naveen Kumar K                 | V.S.K Degree & P.G College.Bhimavaram                               |
| 304 | T. Tritva jyothi kiran         | AKNU  |

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***FEEDBACK***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

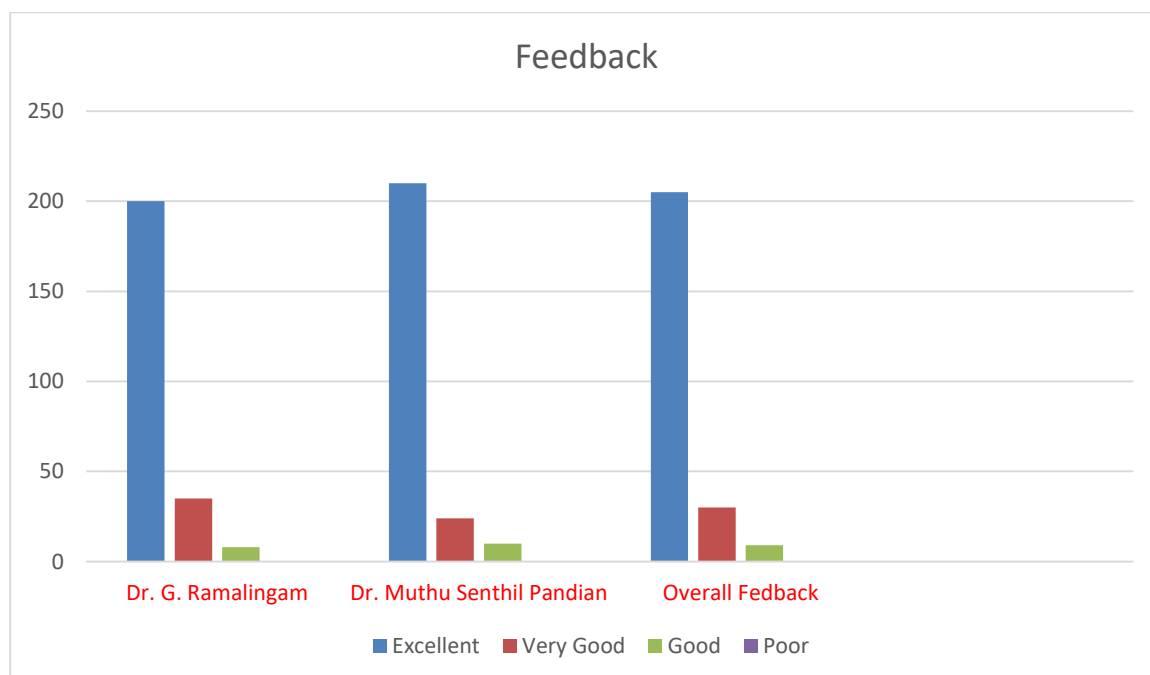
## Feedback

As the feedback form is linked with the automatic generation of e-Certificates, Participants who faced overlapping issues in their certificates, submitted the form again.

So, the responses were finally 244

How do we find the content of the session?

| FEEDBACK                 | EXCELLENT | GOOD | FAIR | POOR |
|--------------------------|-----------|------|------|------|
| DR. G. Ramalingam        | 200       | 35   | 08   | 01   |
| Dr. Muthu Snthil Pandian | 210       | 24   | 10   | 00   |
| OVERALL FEEDBACK         | 205       | 30   | 09   | 00   |



**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***E-CERTIFICATE***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



**ADIKAVI NANNAYA UNIVERSITY**

**RAJAMAHENDRAVARAM**

**Certificate of Participation**

This is to certify that

Mr. / Mrs. .... from the organization  
..... has participated in a Faculty Development Programme on

**"ADVANCES IN NANOMATERIALS & SINGLE CRYSTALS ON PRACTICAL  
DEVICE APPLICATIONS"**

Organised by Department of Physics, Adikavi Nannaya University, Rajamahendravaram on 3<sup>rd</sup>  
February 2021 through virtual platform.

**Dr. S. Rajyalakshmi**  
Convener  
Dept of Physics, UCST,  
Adikavi Nannaya University,  
Rajamahendravaram

**Dr. K. Rameswari**  
Principal, UCST,  
Adikavi Nannaya University,  
Rajamahendravaram

**Prof. T. ASHOK**  
Registrar,  
Adikavi Nannaya University,  
Rajamahendravaram

**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



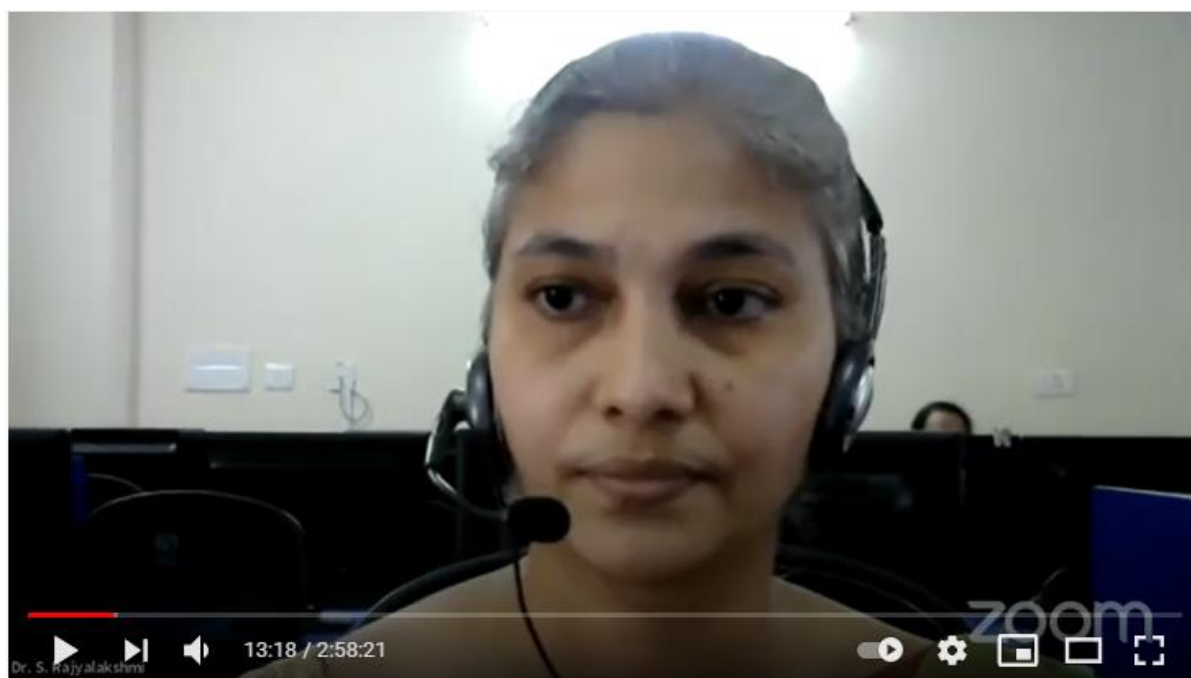
***PHOTO GALLERY***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Photo Gallery Brochure Release



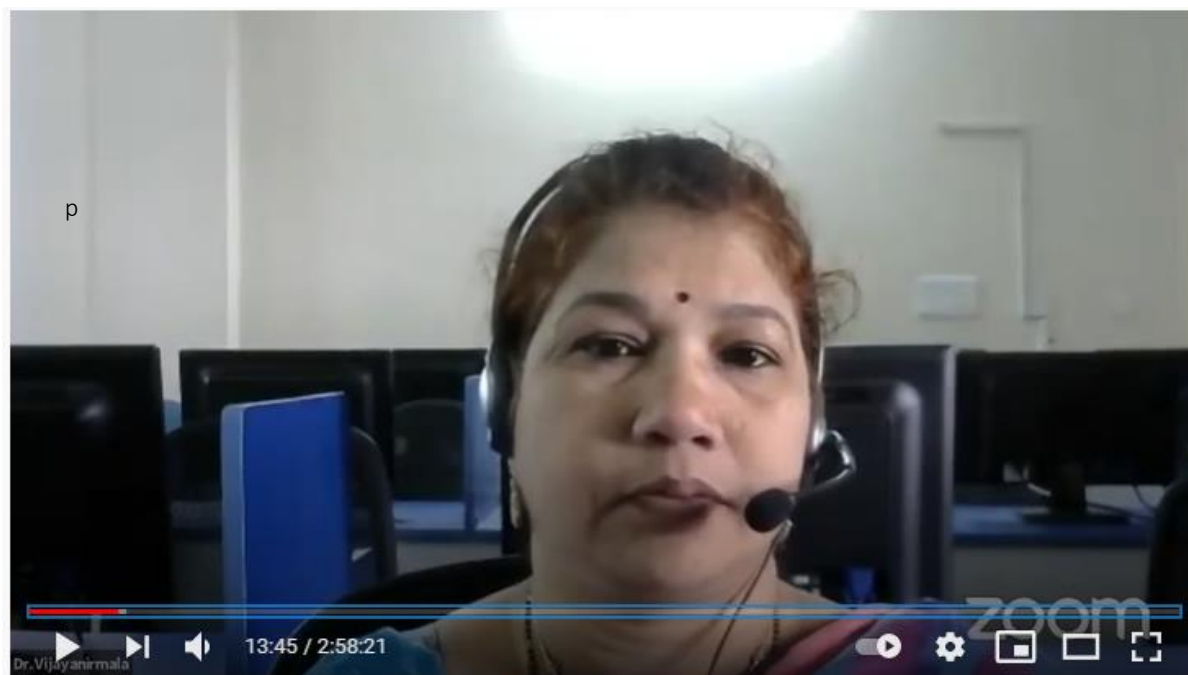
**Convenor, Dr. S. RAJYALAKSHMI Message:**



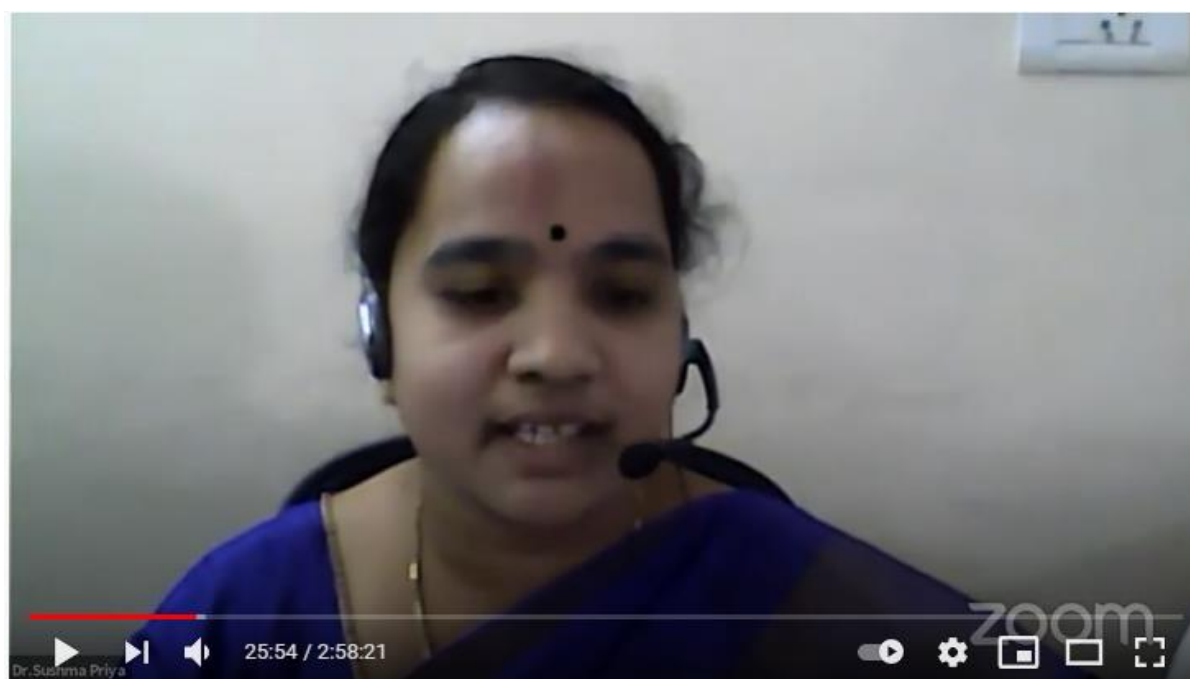
FDP on Advances in Nanomaterials and single Crystals for practical Device Applications

**Opening Remarks by DR. P. VIJAYA NIRMALA, Principal (I/c),  
UCST,AKNU**

## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



**Introduction of Chief Guest, Prof. Mokka Jagannadha Rao, Vice chancellor by Mrs. Y. SUSHMA PRIYA, Dept. of Physics, AKNU**



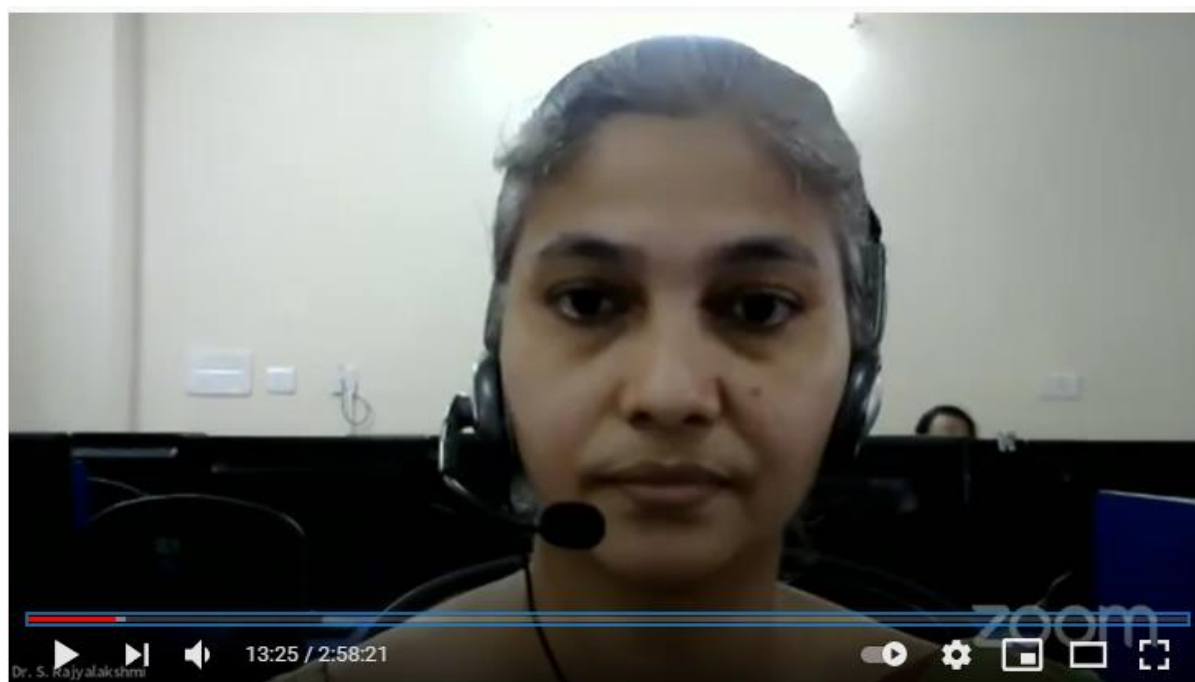
**Chief Guest, PROF.M. JAGANNADHA RAO'S Message:**



## Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

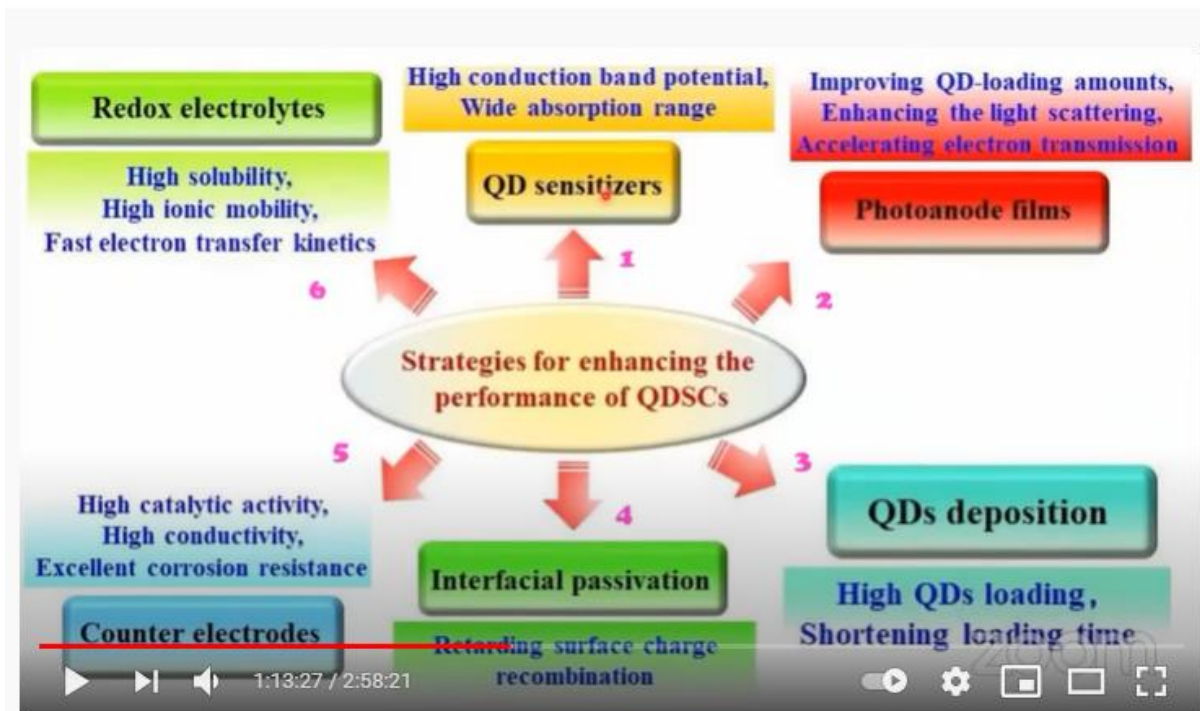


**Introduction of Rsource Person, Dr. G. Ramalingam by Dr. S. Rajyalakshmi, Dept. of Physics, AKNU**



**Presentation of the Resource Person Dr. G. Ramalingam during the session:**

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021



Presentation of the Resource Person Dr. Muthu Snthil Pandian, during the session:

### Characterization Measurements

Dr. Muthu Sen...

- ▶ Samples were prepared with the identical thickness.
- ▶ The surface damage is affected by the energy absorbing defects such as strains, scratches and polishing contaminants which influence the physical properties strongly. Therefore the experiments are performed on the highly polished crystals thus minimizing any surface defects.
- ▶ In order to confirm the reproducibility, every characterization was repeated several times and the similar results have been observed.

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

Vote of thanks by Mr. V. RAJASKHEKAR, Assistant Professor, Department of Physics, AKNU



**Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021**



***PAPER CLIPPINGS***

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Paper Clippings

ANDHRAJYOTHI DATED 04<sup>TH</sup> Feb, 2021.

(RAJAHMUNDRY EDITION)

**'నూతన విద్యావిధానంలో పరిశోధనలకు ప్రాధాన్యం'**

దివాన్చెరువు, ఫిబ్రవరి 3 : నూతన విద్యావిధానంలో పరిశోధనలకు అధిక ప్రాధాన్యం ఇస్తామని ఆదికవి నన్నయ విశ్వవిద్యాలయం ఉపకులపతి మొక్కా జగన్నాథరావు అన్నారు. కళాశాలలు వాటిని ఆసునరించి పరిశోధనలకు పెద్దపీట వేయాలని తెలిపారు. ఉభయగోదావరి జిల్లాల్లో ఆదికవి నన్నయ విశ్వవిద్యాలయం అనుబంధ డిగ్రీ కళాశాలలకు నూతన విద్యాసంవత్సరం 2020-21 పాఠ్యాంశాలపై అవగాహన సదస్సును బుధవారం విశ్వవిద్యాలయంలో నిర్వహించారు. నూతన విద్యావిధానాన్ని ప్రణాళికా బద్ధంగా ముందుకు తీసుకువెళ్లాల్సిన బాధ్యత కళాశాలలపై ఉందన్నారు. అకడమిక్ అఫైర్స్ డీన్ ఆచార్య వై.శ్రీనివాసరావు మాట్లాడుతూ నూతన విద్యావిధానం ప్రకారం ఈ ఏడాది నుంచి 4 సంవత్సరాల డిగ్రీకోర్సును అందుబాటులోకి తీసుకువస్తున్నామని చెప్పారు. దీనిలో సాధారణ డిగ్రీతోపాటు లైపెన్సిల్ కోర్సులు, స్కిల్ డెవలప్ మెంట్ కోర్సులు ప్రవేశపెడుతున్నట్లు తెలిపారు. నాలుగు సంవత్సరాల డిగ్రీకోర్సు పాఠ్యాంశాలు, తరగతుల నిర్వహణ ప్రాజెక్టులు, క్రెడిట్లను వివిధ కళాశాలల ప్రెసిన్సిపాల్స్ కు, విభాగాధిపతులకు అవగాహన కల్పించారు. కార్యక్రమంలో సీడీసీ డీన్ ఎం.కమలకుమారి, ప్యాకట్ అసోసియేట్ ఎం. గోపాలకృష్ణ, అసిస్టెంట్ కో ఆర్డినేటర్ ఎం.శ్రీధర్ పాల్గొన్నారు.

**ఆంధ్రజ్యోతి** Thu, 04 February 2021  
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ANDHRAJYOTHI DATED 04<sup>TH</sup> JUNE, 2020.

(RAJAHMUNDRY EDITION)

**ఈనాడు**  
epaper.eenadu.net

**పరిశోధనలకు ప్రాధాన్యం**

నన్నయ విశ్వవిద్యాలయం(రాజావరం): పరిశోధనలకు పెద్దపీట వేయాలని నన్నయ విశ్వవిద్యాలయం ఉపకులపతి ఆచార్య ఎం.జగన్నాథరావు పేర్కొన్నారు. యూనివర్సిటీ అనుబంధ డిగ్రీ కళాశాలలకు నూతన విద్యా సంవత్సరం పాఠ్యాంశాలపై బుధవారం అవగాహన సదస్సు నిర్వహించారు. అకడమిక్ అఫైర్స్ డీన్ ఆచార్య వై.శ్రీనివాసరావు మాట్లాడారు. \* అడ్వాన్స్ ఐన్ నానో మెటీరియల్స్ అండ్ సింగిల్ క్రిస్టల్స్ పర్ ప్రాక్టికల్ డివైస్ అప్లికేషన్స్ అనే అంశంపై బుధవారం శిక్షణ కార్యక్రమం జరిగింది.

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# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

గురువారం 4 ఫిబ్రవరి 2021

ఆంధ్రజ్యోతి తూర్పుగోదావరి

## నానో మెటీరియల్స్పై అధ్యయనాలు పెరగాలి

● నన్నయ ఉపకులపతి  
ఎం. జగన్నాథరావు

దివాన్చెరువు, ఫిబ్రవరి 3: ఆధునిక సాంకేతిక విజ్ఞానం అభివృద్ధి చెందుతున్న నేటికాలంలో నానో మెటీరియల్స్పై అధ్యయనాలు పెరగాలని ఆదికవి నన్నయ విశ్వవిద్యాలయం ఉపకులపతి మొక్కా జగన్నాథరావు అన్నారు. విశ్వవిద్యాలయంలో అధ్యాప్తస్ ఇన్ నానో మెటీరియల్స్ అండ్ సింగిల్ క్రిస్టల్స్ పర్ ప్రాక్టికల్ డివైస్ అప్లికేషన్స్ అనే అంశంపై ప్యాకల్డ్ డెవలప్ మెంట్ ప్రోగ్రామ్ను జాతికశాస్త్రం అధ్యయనంలో ఎన్.రాజ్యలక్ష్మి కస్టోడియన్ గా బుధవారం నిర్వహించారు. ఈ కార్యక్రమానికి పీసీ ముఖ్యఅతిథిగా హాజరై మాట్లాడుతూ నానో టెక్నాలజీ దశాబ్దాలుగా అందరి దృష్టిని ఆకర్షిస్తుందన్నారు. భవిష్యత్ తరాల సెన్సింగ్ సాధనాల అభివృద్ధికి ప్రత్యేకమైన అవకాశాలను అందిస్తుందన్నారు. ఇంజనీరింగ్ నానో ప్రాక్టికల్స్ ఉపయోగించి జీవ అణువులను ఎన్నుకోవడానికి పాయింట్ ఆఫ్ కేర్ పరికరాలు రోగనిర్ధారణ రంగంలో ప్రధాన పరిశోధనగా మారాయని చెప్పారు. వైద్య

విజ్ఞానశాస్త్రంలో సూక్ష్మ పదార్థాలు ముఖ్యమైన పాత్రలను పోషిస్తున్నాయని తెలిపారు. సూక్ష్మ సున్నితమైన బయోసెన్సర్లు నుంచి పొందిన నానో మెటీరియల్స్ నిజమైన సామర్థ్యాన్ని కలిగి ఉంటాయన్నారు. వివిధ వ్యాధులతో సంబంధం ఉన్న అరుదైన పదార్థాలు, జన్యుసంకేతాలను ముందుగా గుర్తించడానికి ఇవి చాలా అవసరమని చెప్పారు. నానో సాంకేతికతపై మరిన్ని పరిశోధనలు చేసి మెరుగైన పరికరాలను తీసుకురావాలన్న బాధ్యత భావి పరిశోధకులపై ఉందన్నారు. నానో మెటీరియల్స్కు చెందిన అనేక అంశాలపై తమిళనాడు కు చెందిన నానోసైన్స్ అధ్యాపకులు డాక్టర్ జిరామలింగం, చెన్నై పరిశోధనా శాస్త్రవేత్త డాక్టర్ మత్తు సింథిల్ పాండియన్ వివరించారు. కార్యక్రమంలో రిజిస్ట్రార్ ఆచార్య డి.ఆశోక్, ప్రెసిడెంట్ కె.రమణేశ్వరి, యూజీసీ కోఆర్డినేటర్ పి.విజయనిర్మల, కోకస్టేషన్ల వై.సుష్మ ప్రయి, ఎన్.ఎస్.సుబ్బారావు, వి.రాజశేఖర్ పాల్గొన్నారు.

గురువారం 4 ఫిబ్రవరి 2021

ఆంధ్రజ్యోతి తూర్పుగోదావరి

## 'నూతన విద్యావిధానంలో పరిశోధనలకు ప్రాధాన్యం'

దివాన్చెరువు, ఫిబ్రవరి 3 : నూతన విద్యావిధానంలో పరిశోధనలకు అధిక ప్రాధాన్యం ఇస్తామని ఆదికవి నన్నయ విశ్వవిద్యాలయం ఉపకులపతి మొక్కా జగన్నాథరావు అన్నారు. కళాశాలలు వాటిని ఆనుసరించి పరిశోధనలకు పెద్దపేట వేయాలని తెలిపారు. ఉభయగోదావరి జిల్లాల్లో ఆదికవి నన్నయ విశ్వవిద్యాలయం అనుబంధ డిగ్రీ కళాశాలలకు నూతన విద్యాసంవత్సరం 2020-21 పాఠ్యాంశాలపై అవగాహన సదస్సును బుధవారం విశ్వవిద్యాలయంలో నిర్వహించారు. నూతన విద్యావిధానాన్ని ప్రణాళికా బద్ధంగా ముందుకు తీసుకువెళ్లాల్సిన బాధ్యత కళాశాలలపై ఉందన్నారు. అకడమిక్ ఆఫైర్స్ డీన్ ఆచార్య వై.శ్రీనివాసరావు మాట్లాడుతూ నూతన విద్యావిధానం ప్రకారం ఈ ఏడాది నుంచి 4 సంవత్సరాల డిగ్రీకోర్సును అందుబాటులోకి తీసుకువస్తున్నామని చెప్పారు. దీనిలో సాధారణ డిగ్రీతోపాటు లైఫ్ సైన్స్ కోర్సులు, స్కిల్ డెవలప్ మెంట్ కోర్సులు ప్రవేశపెడుతున్నట్లు తెలిపారు. నాలుగు సంవత్సరాల డిగ్రీకోర్సు పాఠ్యాంశాలు, తరగతుల నిర్వహణ ప్రాజెక్టులు, క్రెడిట్లను వివిధ కళాశాలల ప్రెసిడెంట్లకు, విభాగాధిపతులకు అవగాహన కల్పించారు. కార్యక్రమంలో సీడీసీ డీన్ ఎం.కమలకుమారి, ప్యాకల్డ్ అసోసియేట్ ఎం. గోపాలకృష్ణ, అసిస్టెంట్ కో ఆర్డినేటర్ ఎం.శ్రీధర్ పాల్గొన్నారు.

ANDHRAJYOTHI DATED 04<sup>TH</sup> Feb, 2021.  
(RAJAHMUNDRI EDITION)

# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## నానో మెటీరియల్స్పై అధ్యయనాలు పెరగాలి

● నన్నయ ఉపకులపతి  
ఎం. జగన్నాథరావు

దివాన్చెరువు, పిబ్రవరి 3: ఆధునిక సాంకేతిక విజ్ఞానం అభివృద్ధి చెందుతున్న నేటికాలంలో నానో మెటీరియల్స్పై అధ్యయనాలు పెరగాలని ఆదికవి నన్నయ విశ్వవిద్యాలయం ఉపకులపతి మొక్కా జగన్నాథరావు అన్నారు. విశ్వవిద్యాలయంలో ఆధ్యాత్మిక ఇన్ నానో మెటీరియల్స్ అండ్ సింగిల్ క్రిస్టల్స్ పర్ ప్రాక్టికల్ డివైస్ అప్లికేషన్స్ అనే అంశంపై ప్యాకల్డ్ డెవలప్ మెంట్ ప్రోగ్రామ్ను బోధికావ్రం అధ్యక్షులలో ఎన్.రాజ్యలక్ష్మి కన్వీనర్గా బుధవారం నిర్వహించారు. ఈ కార్యక్రమానికి పీసీ ముఖ్యఅతిథిగా హాజరై మాట్లాడుతూ నానో టెక్నాలజీ దశాబ్దాలుగా అందరి దృష్టిని ఆకర్షిస్తుందన్నారు. భవిష్యత్ తరాల సెస్టింగ్ సాధనాల అభివృద్ధికి ప్రత్యేకమైన అవకాశాలను అందిస్తుందన్నారు. ఇంజనీరింగ్ నానో ప్రాక్టికల్స్ ఉపయోగించి జీవ అణువులను ఎన్నుకోవడానికి పాయింట్ ఆఫ్ కేర్ పరికరాలు రోగనిర్ధారణ రంగంలో ప్రధాన పరిశోధనగా మారాయని చెప్పారు. వైద్య

విజ్ఞానశాస్త్రంలో సూక్ష్మ పదార్థాలు ముఖ్యమైన పాత్రలను పోషిస్తున్నాయని తెలిపారు. సూక్ష్మ సున్నితమైన బయోసెన్సర్లు నుంచి పొందిన నానో మెటీరియల్స్ నిజమైన సామర్థ్యాన్ని కలిగి ఉంటాయన్నారు. వివిధ వ్యాధులతో సంబంధం ఉన్న అరుదైన పరమాణు, జన్యుసంకేతా లను ముందుగా గుర్తించడానికి ఇవి చాలా అవసరమని చెప్పారు. నానో సాంకేతికతపై మరిన్ని పరిశోధనలు చేసి మెరుగైన ఫలితాలను తీసుకురావాల్సిన బాధ్యత భావి పరిశోధకులపై ఉందన్నారు. నానో మెటీరియల్స్ చెందిన అనేక అంశాలపై తమిళనాడు కు చెందిన నానోసైన్స్ అధ్యాపకులు డాక్టర్ జి.రామలింగం, చెన్నై పరిశోధనా శాస్త్రవేత్త డాక్టర్ మత్తు సింథిల్ పాండియన్ వివరించారు. కార్యక్రమంలో రిజిస్ట్రార్ ఆచార్య టి.అశోక్, ప్రిన్సిపాల్ కె.రమణేశ్వరి, యూజీసీ కోఆర్డినేటర్ పి.విజయనిర్మల, కోకస్వినర్లు వై.సుబ్బ ప్రీయ, ఎన్.ఎస్.సుబ్బారావు, వి.రాజశేఖర్ పాల్గొన్నారు.

అంధ్రజ్యోతి Thu, 04 February 2021  
<https://epaper.andhrajyothy.com/c/58203462>



ANDHRAJYOTHI DATED 04<sup>TH</sup> Feb, 2021.  
(RAJAHMUNDRY EDITION)

## 'నూతన విద్యావిధానంలో పరిశోధనలకు ప్రాధాన్యం'

దివాన్చెరువు, పిబ్రవరి 3 : నూతన విద్యావిధానంలో పరిశోధనలకు ఆదిక ప్రాధాన్యం ఇస్తామని ఆదికవి నన్నయ విశ్వవిద్యాలయం ఉపకులపతి మొక్కా జగన్నాథరావు అన్నారు. కళా శాలలు వాటిని అనుసరించి పరిశోధనలకు పెద్దపీట వేయాలని తెలిపారు. ఉభయగోదావరి జిల్లాల్లో ఆదికవి నన్నయ విశ్వవిద్యాలయం అనుబంధ డిగ్రీ కళాశాలలకు నూతన విద్యాసంవత్సరం 2020-21 పాఠ్యాంశాలపై అవగాహన సదస్సును బుధవారం విశ్వవిద్యాలయంలో నిర్వహించారు. నూతన విద్యావిధానాన్ని ప్రణాళికా బద్ధంగా ముందుకు తీసుకువెళ్లాల్సిన బాధ్యత కళాశాలలపై ఉందన్నారు. ఆకడమిక్ అఫైర్స్ డీన్ ఆచార్య వై.శ్రీనివాసరావు మాట్లాడుతూ నూతన విద్యావిధానం ప్రకారం ఈ ఏడాది నుంచి 4 సంవత్సరాల డిగ్రీకోర్సును అందుబాటులోకి తీసుకువస్తున్నామని చెప్పారు. దీనిలో సాధారణ డిగ్రీతోపాటు లైపెన్సిల్ కోర్సులు, స్కిల్ డెవలప్ మెంట్ కోర్సులు ప్రవేశపెడుతున్నట్లు తెలిపారు. నాలుగు సంవత్సరాల డిగ్రీకోర్సు పాఠ్యాంశాలు, తరగతుల నిర్వహణ ప్రాజెక్టులు, క్రెడిట్లను వివిధ కళాశాలల ప్రిన్సిపాల్స్ కు, విభాగాధిపతులకు అవగాహన కల్పించారు. కార్యక్రమంలో సీడీసీ డీన్ ఎం.కమలకుమారి, ప్యాకల్డ్ అసోసియేట్ ఎం. గోపాలకృష్ణ, అసిస్టెంట్ కో ఆర్డినేటర్ ఎం.శ్రీధర్ పాల్గొన్నారు.

అంధ్రజ్యోతి Thu, 04 February 2021  
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# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

తూర్పుగోదావరి సాక్షి గురువారం, 4 ఫిబ్రవరి, 2021

## పరిశోధనలకు ప్రాధాన్యమివ్వండి

రాజాసగరం: నూతన విద్యా విధానాన్ని అనుసరించి యూనివర్సిటీలో పరిశోధనలకు అధిక ప్రాధాన్యతనిస్తున్నామని, ఇదే విధానాన్ని కళాశాలలు కూడా అనుసరించాలని ఆదికవి నన్నయ యూనివర్సిటీ వీసీ ఆచార్య ఎం. జగన్నాథరావు సూచించారు. ఉభయ గోదావరి జిల్లాలోని అనుబంధ కళాశాలల ప్రతినిధులతో నూతన విద్యా విధానంపై బుధవారం అవగాహన సదస్సు నిర్వహించారు. విద్యార్థులకు నాణ్యమైన విద్యను అందించడంతోపాటు నైపుణ్యాలను వృద్ధి చేసి, ఉపాధి అవకాశాలు కల్పించాలనే ఉద్దేశంతో కేంద్రం ప్రభుత్వం నూతన విద్యా విధానాన్ని అమలు చేస్తోందన్నారు. దీనిని ప్రణాళికాబద్ధంగా ముందుకు తీసుకువెళ్లవలసిన బాధ్యత కళాశాలలపై ఉందన్నారు. అకడమిక్ అఫైర్స్ డీన్ డాక్టర్ వై.శ్రీనివాసరావు మాట్లాడుతూ ఈ ఏడాది నుంచి నాలుగు సంవత్సరాల డిగ్రీ కోర్సును అందుబాటులోకి తీసుకువస్తున్నామన్నారు.



సమావేశంలో మాట్లాడుతున్న వీసీ జగన్నాథరావు

లైఫ్ స్కిల్, డెవలప్ మెంట్ స్కిల్ కోర్సులు కూడా ప్రవేశపెడుతున్నామన్నారు. కార్యక్రమంలో యూనివర్సిటీలో వివిధ విభాగాల అధికారులు, ప్రిన్సిపాల్స్ పాల్గొన్నారు.

### పరిశోధనలకు ప్రాధాన్యం

నన్నయ విశ్వవిద్యాలయం(రాజాసగరం): పరిశోధనలకు పెద్దపీట వేయాలని నన్నయ విశ్వవిద్యాలయ ఉపకులపతి ఆచార్య ఎం.జగన్నాథరావు పేర్కొన్నారు. యూనివర్సిటీ అనుబంధ డిగ్రీ కళాశాలలకు నూతన విద్యా సంవత్సరం పాఠ్యాంశాలపై బుధవారం అవగాహన సదస్సు నిర్వహించారు. అకడమిక్ అఫైర్స్ డీన్ ఆచార్య వై.శ్రీనివాసరావు మాట్లాడారు. + అడ్వాన్స్ గు ఇన్ నానో మెటీరియల్స్ అండ్ సింగిల్ క్రిస్టల్స్ పర్ ప్రాజెక్ట్ కల్ డివైస్ అప్లికేషన్స్ అనే అంశంపై బుధవారం శిక్షణ కార్యక్రమం జరిగింది.

**ఈనాడు**  
**తూర్పుగోదావరి**



# Faculty Development Program on "Advances in Nanomaterials & Single Crystals on Practical Device Applications"-2021

## Nannaya Vani

**ADIKAVI NANNAYA UNIVERSITY**  
RAJAMAHENDRAVARAM

**Faculty Development Programme (FDP)**  
On  
**Advances in Nanomaterials and Single Crystals**  
for Practical Device Applications

Organized by  
Department of Physics  
University College of Science & Technology  
Adikavi Nannaya University

Date of Time: February 3rd 2021 at 9:00 am onwards  
Duration: Faculty members, Research scholars, students of Undergraduate  
Note: Certificate will be issued to the participants.

**Chief Patron**  
Prof. Mukta Jagannatha Rao  
Vice-Chancellor

**Patron**  
Prof. T. Ashok  
Vice-Chancellor

**Patron**  
Dr. K. Rameshwarani  
Vice-Chancellor

**Speakers**  
Dr. G. Ramalingam  
Assistant Professor  
Dept. of Physics, Anna University,  
Madurai, Tamil Nadu

Dr. Muthu Senthil Paulian  
Assistant Professor  
Dept. of Physics, Anna University,  
Madurai, Tamil Nadu

**About webinar**  
The aim of the Faculty Development Programme (FDP) is to provide the knowledge of advanced nano materials and single crystals in fabric and technology in different domains. The FDP programme will focus on create a platform between faculty and students to fill the gap between research in laboratory and its industrial applications. These activities will provide opportunities an exposure to the frontiers of nanomaterials and its Application in Solar Cells and development of high quality nonlinear optical (NLO) and ferroelectric single crystals for several biomedical devices (SBD) and its device applications. This will also provide a platform for the participants to interact with the leading scientists and technologists and benefit from their vast experience in the area.

**CONTACT**  
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Dr. Rameshwarani  
Dr. Rameshwarani

**ORGANIZERS**  
Mrs. V. Sankaranarayanan (Course Coordinator), Dept. of Physics, ANUR  
Mr. M. Subhakar Sathya Rao, Dept. of Physics, ANUR  
Mr. V. Rajasekhar, Dept. of Physics, ANUR

**REGISTRATION**  
Webinar Link will be sent to your registered email  
<https://www.zoom.us/j/92011111111> **CLICK HERE**

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## నానోమెటీరియల్స్పై అధ్యయనాలు పెరగాలి

03.02.21 (వీడియోసెల్) ఆధునిక సాంకేతిక విజ్ఞానం అభివృద్ధి చెందుతున్న నేటి కాలంలో నానో మెటీరియల్స్పై అధ్యయనాలు మరింత పెరగాలని ఆదికవి నన్నయ విశ్వవిద్యాలయ ఉపకులపతి ఆచార్య మొక్కా జగన్నాథరావు అన్నారు. విశ్వవిద్యాలయంలో “అడ్వాన్సెస్ ఇన్ నానోమెటీరియల్స్ అండ్ సింగిల్ క్రిస్టల్స్ ఫర్ ప్రాక్టికల్ డివైస్ అప్లికేషన్స్” అనే అంశంపై ఫ్యాకల్టీ డెవలప్మెంట్ ప్రోగ్రామ్ను డిపార్ట్మెంట్ ఆఫ్ ఫిజిక్స్ ఆధ్వర్యంలో డా.ఎన్.రాజ్యలక్ష్మి కన్వీనర్గా నిర్వహించారు. ఈ కార్యక్రమానికి ముఖ్యఅతిథిగా వీసీ ఆచార్య మొక్కా జగన్నాథరావు హాజరై ఉపన్యసించారు. నానోటెక్నాలజీ దశాబ్దాలుగా అందరి దృష్టిని ఆకర్షిస్తుందని భవిష్యత్ తరాల సెన్సింగ్ సాధనాల అభివృద్ధికి ప్రత్యేకమైన అవకాశాలను అందిస్తుందన్నారు. ఇంజనీరింగ్ నానోఫ్యాక్టరీ ఉపయోగించి జీవఅణువులను ఎన్నుకోవటానికి పాయింట్ ఆఫ్ కేర్ పరికరాలు రోగనిర్ధారణ రంగంలో ప్రధాన పరిశోధనగా మారాయని చెప్పారు. వైద్య విజ్ఞాన శాస్త్రంలో సూక్ష్మ పదార్థాలు ముఖ్యమైన

### వీసీ ఆచార్య మొక్కా జగన్నాథరావు

పాత్రలను పోషిస్తున్నాయని తెలిపారు. సూక్ష్మ సున్నితమైన బయోసెన్సార్లు నుండి పొందిన నానో మెటీరియల్స్ నిజమైన సామర్థ్యాన్ని కలిగి ఉంటాయని అన్నారు. వివిధ వ్యాధులతో సంబంధం ఉన్న అరుదైన పరమాణు, జన్యు సంకేతాలను ముందుగా గుర్తించడానికి ఇవి చాలా అవసరమని చెప్పారు. నానో సాంకేతికతపై మరిన్ని అధ్యయనాలు జరిగి మెరుగైన ఫలితాలను తీసుకురావాల్సిన బాధ్యత భవిష్యత్ పరిశోధకులపై ఉందన్నారు. నానోమెటీరియల్స్కు సంబంధించిన అనేక అంశాలపై తమిళనాడుకు చెందిన నానోసైన్సెస్ అధ్యాపకులు డా.జి.రామలింగం, చెన్నై రిసెర్చ్ సెంటిస్ట్ డా.మత్తు సింతిల్ పాండియన్ వివరించారు. ఈ కార్యక్రమంలో రిజిస్ట్రార్ ఆచార్య తుపాకుల అశోక్, ప్రిన్సిపాల్ డా.కె.రమణేశ్వరి, యూజీసీ కోఆర్డినేటర్ డా.పి.విజయనిర్మల, కోకనీసర్లు వై.సుబ్బప్రీయ, ఎన్.ఎన్.సుబ్బరావు, వి.రాజశేఖర్ తదితరులు పాల్గొన్నారు.