



A REPORT ON

Summer Internship 2023

“Tools and Techniques of Molecular Biology & Bioinformatics”

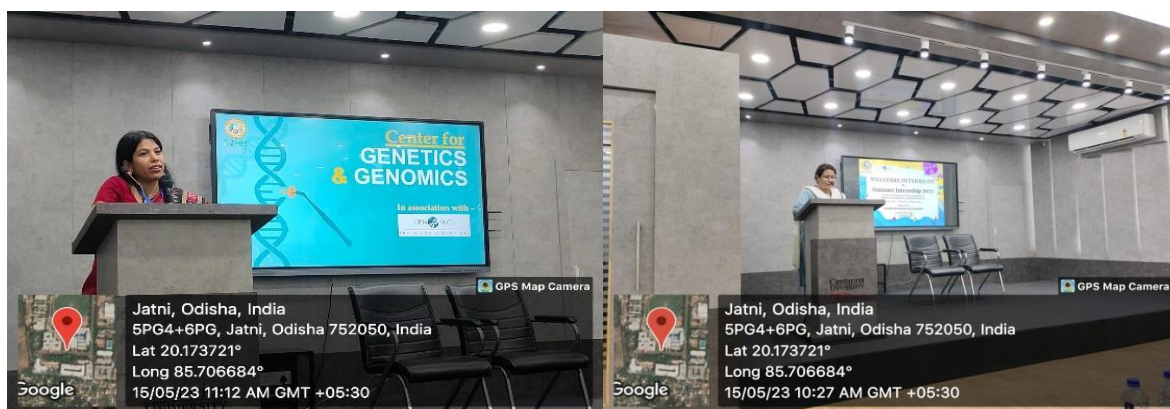
(15th May- 7th June, 2023)

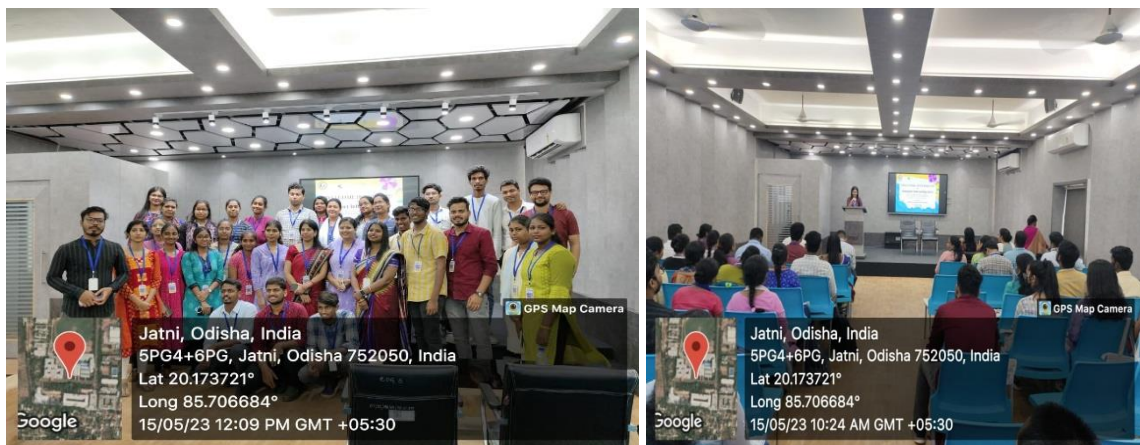
Date and Venue:

The Summer Internship 2023 took place on 15th May- 7th June, 2023, at Department of Botany, School of Applied Sciences in association with the Centre for Genetics and Genomics Research center, and Cenomics at Centurion University of Technology and Management on offline mode. A total number of 25 students including two faculties participated in the hands-on training program from the state of Odisha, Andhrapradesh and Telengana.

Inaugural Session:

The 21 days hands-on training started with the inaugural session on 15th of May at seminar hall, Aryabhatta building. Dr. Rukmini Mishra, Head of Department of Botany and Coordinator of the program welcomed all the participants and encouraged others to learn new skills. The program started with lightning of lamps by the Dignitaries. Dr. Yashaswi Nayak, Dean, School of Applied sciences addressed the gathering about the importance of molecular biology. The program coordinator requested the faculties to enlighten with their words of wisdom. Dr. Sagarika Parida, Dr. Madhusmita Barik, Dr. Jatindra Nath Mohanty, Dr. Gagan Panigrahi, Dr. Kalpita Bhatta, and Dr. Animesh Pattnaik gave a brief explanation about the internship.





Inauguration time with Dean Madam and all participants' faculties and interns

Objectives:

The internship was conducted to give hands-on experience to students and faculty members on several techniques and tools. Our main objectives are to provide practical experience in the field by bridging the gap between theoretical knowledge and real-world applications in the field of tissue culture, molecular biology & bioinformatics. Additionally, the internship provided opportunities for networking, professional development, and enhancing critical thinking and problem-solving skills to the interns.

No. of Students Participated: 25

Convener Details:

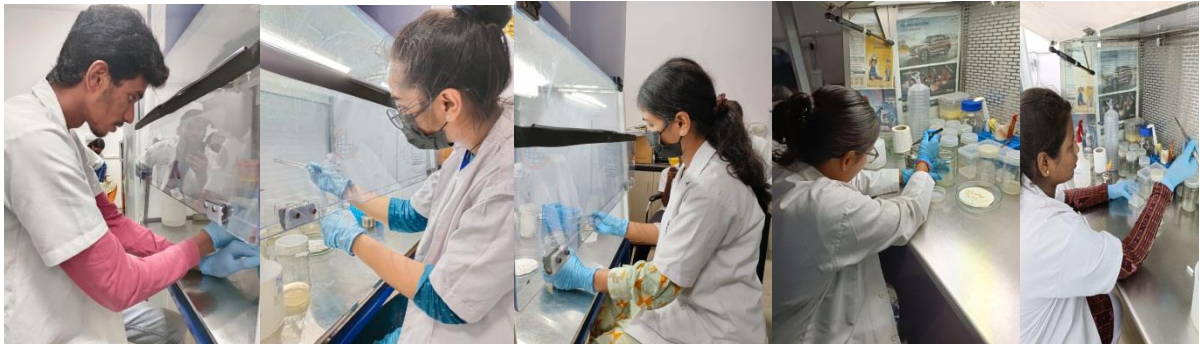
- Dr. Rukmini Mishra**, Head of Department of Botany and Coordinator of the Centre for Genetic Engineering and Genomics. School of Applied Sciences, Centurion University of Technology and Management

2. **Dr. Jatindra Nath Mohanty**, Department of Botany and Centre for Genetic Engineering and Genomics. School of Applied Sciences, Centurion University of Technology and Management.
3. **Dr. Madhusmita Barik**, Department of Botany and Centre for Genetic Engineering and Genomics. School of Applied Sciences, Centurion University of Technology and Management.
4. **Dr. Animesh Pattnaik**, Centre for Genetic Engineering and Genomics. School of Applied Sciences, Centurion University of Technology and Management.

1st week details with few snap

On the first day of the internship, Dr. Rukmini Mishra delivered an expert talk on “Introduction to plant tissue culture”. She explained about the basics of plant tissue culture technique, including history, principles, and applications. She also explained the importance of tissue culture in plant propagation, plant breeding, genetic engineering, and the production of pharmaceuticals. She also discussed the objectives of the internship. After the expert talk participants were escorted to the Genetic Engineering and Genomics Laboratory by the research scholars. Second day started with a step-by-step explanation and preparation of stock solutions for tissue culture. It is followed by sterilization techniques and aseptic laboratory practices, media preparation and composition. While giving the participants hands-on training, she discussed various types of culture media and growth regulators used in media and their specific roles in promoting cell division, differentiation, and organogenesis. Micropropagation, seed culture, callus culture, protoplast isolation were performed and guided by Dr. Madhusmita Barik. The hands-on training continued, and every participant got involved in tissue culture techniques. In that same week, Dr. Rukmini Mishra delivered an expert talk on “Genome editing strategies”. In which she explained different tools in genome editing in plants and their roles. Dr. Raj Kumar Joshi, Associate professor, Department of Biotechnology, Rama Devi Women’s University, and Bhubaneswar also delivered an expert talk on “Introduction to molecular breeding techniques”. He explained from classical breeding to advance molecular breeding techniques and their significance taking the market values in to account in different valuable crop in that week. Demonstration of Gene selection, gRNA design and vector designing were also done by Ms Sonupriya Sahoo. Dr. Jatindra Nath Mohanty explained details on reagent preparation (CTAB Buffer), procedure and concept of DNA isolation from plant animal, fungus, bacteria, and plasmid as well. The interns performed DNA isolation from a plant leaf sample, fungal and bacterial

sample and carried out all the hands-on steps involved in the DNA isolation process supervised by Dr. Jatindra Nath Mohanty, with the help of Mr Dibyashree S Jena, Mr Subham Jyoti Sahoo, Ms Sunanya Das.



Hands on tissues culture by intern's inside laminar airflow



DNA isolation experiment with demonstration and hands on by interns and our respected Babu Shankar sir visited during internship time

2nd week details with few snap

In this week, RNA isolation, Isolation of plasmid DNA were carried out. The extraction of RNA was done using Liquid Nitrogen and TRIzol reagent Method by Ms. Sonupriya Sahoo, guided by Dr. Jatindra Nath Mohanty. The students also gained hands-on experience in performing the isolation process. In this week, Dr. Jatindra Nath Mohanty delivered a lecture on principles of PCR, its mechanism and its applications in the field of Molecular Biology. He then guided the participants to set up a reaction mixture for DNA amplification using PCR machine (Thermo Cycler). The principle and use of PCR components were explained to them and they performed PCR. They also gained hands-on experience in performing PCR after master mix preparation. The gel electrophoresis were instructed and performed. Dr. Mohanty and Mr. Subhamjyoti Sahoo separated the PCR products and other nucleic acids that were previously isolated using 2% and 0.8% agarose gel electrophoresis. The participants were taught how to prepare agarose gel using different buffers, how to load the gel with tracking dye, and the utilization of staining dye for visualizing DNA bands in agarose gel electrophoresis. The restriction digestion, elution of PCR product, DNA ligation & transformation of *E. coli* were instructed and performed by Dr. Mohanty. The Blue/white screening & colony PCR also carried out by Dr. Mohanty. The interns also gained hands-on experience in performing all the above mentioned procedure, supervised by Dr. Mohanty with the help of Mr Dibyashree S Jena, Mr Subham Jyoti Sahoo and Ms Archita Patra. In that same week, Dr. Jatindra Nath Mohanty delivered an expert talk on gene cloning and DNA analysis. During the talk, Dr. Mohanty provided detailed explanations on various types of DNA cloning, the use of restriction enzymes and their types, vectors, cloning methods into vectors, methods of gene transfer, and the blue-white screening procedure. Additionally, he showcased three different case studies based on his own research, highlighting the application of gene cloning and analysis. The students visited other allied sciences departments in our university, engaging in a productive interaction during this week. They also visited to the experimental site, specifically the control greenhouse. A comprehensive doubt-clearing and interactive session was conducted, which included a questionnaire to assess the interns' understanding.



PCR and gel electrophoresis experiment demonstration and hand on image by interns



Gel elution, ligation and cloning experiments





Allied Sciences Laboratory visited by our intern



Dr. Jatindra Nath Mohanty delivered an expert talk on gene cloning and DNA analysis

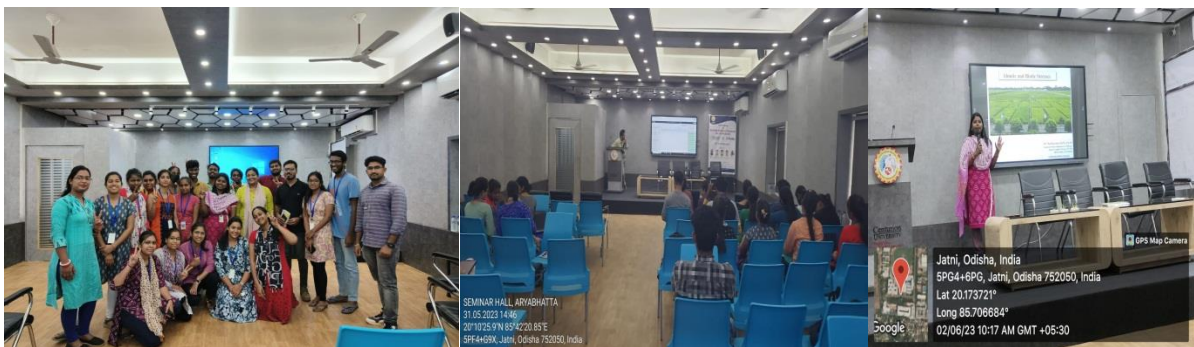
3rd week details with few snap

The 3rd week Started with the expert talk by Animesh Pattnaik on Molecular Biology. During the talk, He discussed about molecular docking, Preparation of protein and selection of natural drugs and importance of molecular docking. This was followed by the hand on practiced by the students from downloading software for molecular docking and visualization. After downloading and installation of software in their system they perform the various steps for molecular modelling of protein and prepare the drugs and perform docking in AutoVina tool and visualized it by the PyMol molecular viewer. Basic Bioinformatics for thorough analysis on different database like NCBI, PUBMED, PUBCHEM, PDB were performed and instructed by Animesh Pattnaik. The interns get trained with multiple sequence, pair sequence alignment, Phylogenetic analysis with MEGA 11 software and Protein Interaction tools. The NGS data analysis and specifically the transcriptome data analysis were performed by Animesh Pattnaik with the help of our NGS commander software. Demonstration of Nanopore sequencing was done by Dr Rukmini Mishra and Dr. Jatindra Nath Mohanty instructed the Oxford Nanopore MinION platform, providing an overview of its functioning in NGS. To showcase the analysis of DNA and RNA, the Qubit instrument was utilized in this week. Dr. Mohanty provided detailed explanations on analyzing DNA based on banding patterns in the gel, using different types of molecular markers as examples.

This session offered valuable insights into molecular analysis techniques in this week too. Dr. Raj Kumar Joshi from Rama Devi Women's University, Bhubaneswar delivered an expert talk on Next Generation Sequencing Strategies. His comprehensive presentation covered both basic and advanced genome sequencing strategies, as well as the platforms used for them. The offline talk led to a fruitful discussion among the participants. Another expert talk on Abiotic and Biotic stresses were delivered Dr Madhusmita Barik in that week, in which she explained about different abiotic stresses like drought, salinity, submergence, temperature, light intensity, mineral toxicity their effect on growth, plant physiology, alterations in gene expression and mechanism. A scientific visit to Nandankanan Zoological Park and Botanical Park were done in this week. A presentation was conducted in the presence of Dr. Jatindra Nath Mohanty, Dr. Madhusmita Barik, and Dr. Animesh Pattanik, featuring the summer interns' work. Based on their performance in the presentation, evaluations were carried out to determine the prize winners. Additionally, they visited the butterfly garden, further enhancing their learning experience.



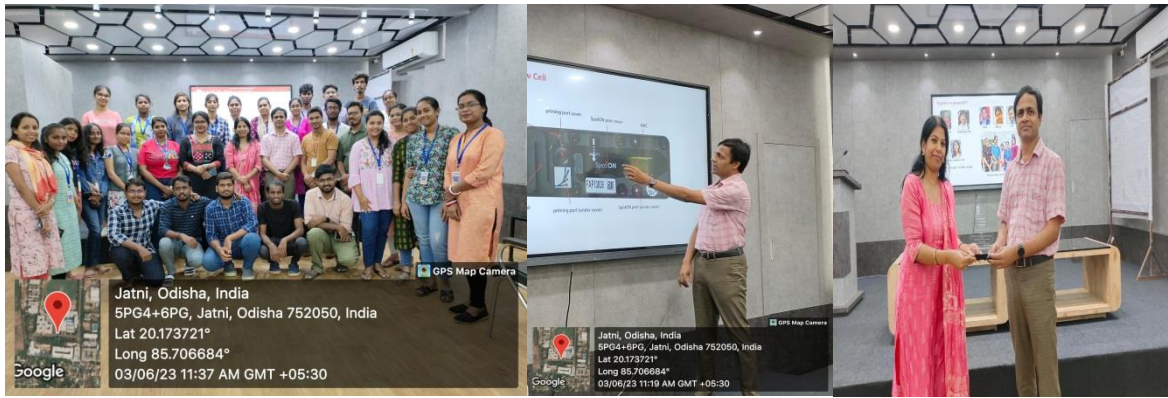
Basic bioinformatics classes and software analysis



Expert talk by Dr. Madhusmita Barik and Dr. Animesh Pattnaik



A scientific visit to Nandankanan Zoological Park



Dr. Raj Kumar Joshi from Rama Devi Women's University, Bhubaneswar delivered an expert talk on Next Generation Sequencing Strategies



Visited to experimental garden and control green house



Prize distribution and valedictory programme

Valedictory program:

The valedictory program graced by esteemed guests including Dr. Supriya Pattnayak, Vice Chancellor of Centurion University of Technology and Management, Dr. Yashaswi Nayak, Dean of the School of Applied Sciences at Centurion University of Technology and Management, as well as all the staff of the Department of Botany and Zoology. The validation program was conducted to acknowledge the interns' achievements, and prize distribution took place based on their performance. During the program, the interns had the opportunity to share their experiences from the past 20 days. They expressed their happiness and gratitude for the hands-on practical experience they gained in various areas such as plant tissue culture, molecular biology, sequencing, and bioinformatics. The interns found their summer holidays well-utilized and were appreciative of the valuable learning experiences provided to them.

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Gmail - SUMMER INTERNSHIP 2023 at Genetics and Genomics Research centre



Debasmita Das <das.smitadeba@gmail.com>

SUMMER INTERNSHIP 2023 at Genetics and Genomics Research centre

1 message


Rukmini Mishra <rukmini.mishra@cutm.ac.in>
To: all <all@cutm.ac.in>, allstudents <allstudents@cutm.ac.in>
Cc: Babu Shankar <babu.shankar@cutm.ac.in>

Tue, Apr 25, 2023 at 3:09 PM

Dear Students,
Hope you are doing well!
Here is an exciting **21 days summer internship** opportunity from the Centre for Genetics and Genomics across the campuses.
You will get an opportunity to learn various advanced molecular techniques like **Extraction methods, PCR, Gel electrophoresis, Cloning and Transformation, Gene sequencing and data analysis as well as cross hybridization of vegetable crops.**
For more information, please go through the flyer below.

Also find attached a short video of the Genomics lab to have an idea about the research activities at Bhubaneswar campus. Students can also work in the Biotechnology lab at PKD campus.

Interested students can register in the link below.
<https://forms.gle/bA6ZX8jh6kfEsCDm9>

 Genomics Lab.mp4

Best regards,

Dr. Rukmini Mishra,
Associate Professor and Head,
Department of Botany,
School of Applied Sciences,
Centurion University of Technology and Management,
Odisha, India



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CENOMICS

TRAININGS & SERVICES

***Only 20
students per
batch.**

Organized by:
CENTRE FOR GENETICS AND GENOMICS

& In association with:
CenOmics

Summer Internship 2023

**Hands-on training on tools & techniques of
MOLECULAR BIOLOGY & BIOINFORMATICS**

15th of May - 07th of June (Offline Mode)

WHAT YOU GET:

Hands-on training and experience
Study materials
Internship certificates

REGISTRATION DETAILS:

TRAINING FEES: 6000/-

(Includes chemical and consumable expenses study materials & Certificate) Food & Accommodation extra.

REGISTRATION LINK:

<https://forms.gle/2UYd2t7VPtXUqVN56>

Got any queries???

Contact:

Dr. Rukmini Mishra

Coordinator: Centre for Genetics and Genomics

Mob: 7077320293

Mail: rukmini.mishra@cutm.ac.in

FOCUS AREAS:

- Screening of plants against biotic stress.
- Isolation, Purification & Quantification of genomic DNA/ RNA (Plants, Bacterial & Fungal)
- PCR & types of Markers.
- Gene cloning & Transformation
- Restriction digestion, Ligation, Colony PCR
- Plant Tissue culture
- Bioinformatics analysis (transcriptomics, whole genome sequencing & variant calling)

✉ cenomics@gmail.com

☎ +91 7077320293

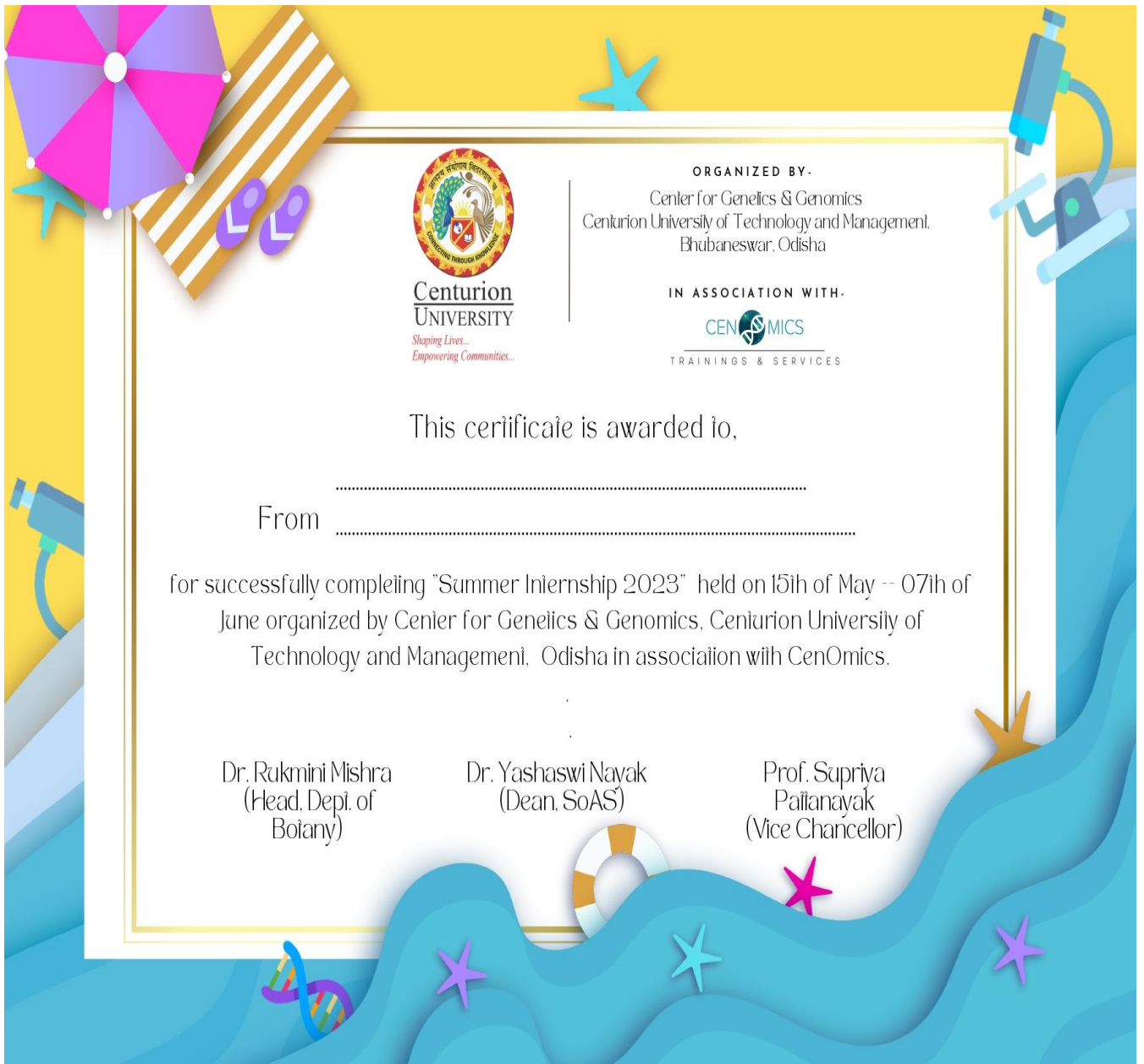
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ORGANIZED BY-

Center for Genetics & Genomics
Centurion University of Technology and Management,
Bhubaneswar, Odisha

IN ASSOCIATION WITH-

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TRAININGS & SERVICES

This certificate is awarded to,

From

for successfully completing "Summer Internship 2023" held on 15th of May -- 07th of June organized by Center for Genetics & Genomics, Centurion University of Technology and Management, Odisha in association with CenOmics.

Dr. Rukmini Mishra
(Head, Dept. of
Botany)

Dr. Yashaswi Nayak
(Dean, SoAS)

Prof. Supriya
Pattnayak
(Vice Chancellor)

Rukmini Mishra

**Dr. Rukmini Mishra
(Program Co-Ordinator)**

Y. Nayak

**Dr. Yashaswi Nayak
(Dean, SoAS)**