ECSTATIC PARADOX
08/19/2021

ANNUAL
ACHIEVEMENT

Report

FIRST YEAR ANNIVERSARY
Uniting Physics and Tech

JOURNEY FROM CURIOSITY TO ECSTATIC PARADOX
Reliving our year-long ventures

Ecstatic Paradox is a student research organization working in the field of science with the commited-motive of uniting Physics and Tech. It specializes in student research writing, simulation development, application-based projects, science publications and engineering.

Introduction

Our perception is our intuition. We intend to make strides in the fields of Physics and Tech and amend the way of independent actions by science activists as team research and a group collaboration activity. We visualize assembling a multinational organizational team that can invigorate spectrums of science, making scientific activities more effective and efficient. It is also a self-learning platform where every member gains proper exposure to ways of scientific communities and a lot of interpersonal skills. We intend to rejuvenate science as group research without the fear of plagiarism and yet make grand contributions through team efforts.

The present mainstream scenario of this so-called globalized, modernized, and advanced world is convicted to be scientific yet indifferent from actual scientific practices. The idea was to form an even team that would come out of the uneven and aligns the way of science which is getting intangible these days.

So, the revolution to cause is the amalgamation of "Pure Physics" with "Advanced Tech". The idea was thought of by Mr. Abhishek Karna, as a scheme with the motive towards adopting Physics as research independently but later finding out Physics and Tech are indistinguishable from each other. So, we emerge to modify the mainstream of science in a substantial revolutionary way.

We as a team are, hopefully, part of history-in-the-making, and thrive to build up a technologically advanced civilization having a bonafide understanding of the laws of nature and their manifestation in physical phenomena. A future with a genuine tangible scientific arena that finally contributes to the entire mankind positively and vibrantly.

Our Team

This organizational initiative is teamwork. A team with brilliant, innovative, and curious minds which have received a platform to make a change and learn as well. We are responsible and abide by the rules of this team. The team should work proactively, collectively, diligently, and flexibly as per the tasks assigned. Only shared actions and minds can make us achieve the best of what we can. From people who pursued theoretical and mathematical physics to data science, web development, machine learning, AI and astrophysics, and more on these now work together professionally. The best thing was that everyone in our team joined voluntarily and pursued their passion. We are working together to create change internationally and intuitively, invigorating the tangible scientific spectrums of the world we live in.

We, student researchers and techers, are the ones contributing to the tangible realms of science. As our team progresses, we should see ourselves as practitioners of Physics and Tech. This incessant thrive that we are on, has got a lot of potentialities. But, I know that the day when we are true solvers of world problems is not far away. Let's keep moving forward!

- **ABHISHEK KARNA, GENERAL MANAGER**

Future Goals

- Expanding the community of researchers,
- Doing applied projects to generate patented technologies in Physics and Tech,
- Develop pathways towards quantum computing and nanotechnology, which serves as the true unification of Physics and Tech,
- Publish web magazines and newsletters,
- Develop partnerships with other research institutions.

Achievements

Physics Simulation: Electrostatics

Physics Simulation: Electrostatics is a wholesome program that helps science practitioners to visualize the fundamental characteristics of the most elementary particles. This project aims to create software that enables users to get a practical approach of charge and fields of particles that can't be done in a common laboratory. We tried to keep the user interface as simple as possible. The program also includes 5 different modes in each design and each mode has a different application, data visualization, calculations, and interpretations. Users can get useful mathematical results as per the input and also learn the concepts from the remarks button. In a nutshell, it is an elegant and appropriate alternative to experiments of charge in a precise but easy way.

The approach for this project was a division of a Physics team and a Data team. The Physics team prepared modules for the concepts required and to be simulated ideas and submitted them to the Data team while the Data team did the coding and prepared user-friendly effects in the software. We've used Javascript for the program. We didn't receive any venture capital for this project, so there are no business drivers. However, we intend to get this program to high schools at a very nominal cost. We expect this program to be profusely effective and useful for students to experiment with things that are not applicable in school labs and understand the topic.

Pandemic Preparedness Index (PPI)

Mr. Abhishek Karna, Mr. Laxman Poudel, Mr. Rahul Gupta, and Mr. Ayush Banjade from the Ecstatic Paradox initiated their project Pandemic Preparedness Index (PPI) from July 23-29, 2021 for EO Dashboard Hackathon organized by NASA (the National Aeronautics and Space Administration), ESA (the European Space Agency), and JAXA (the Japan Aerospace Exploration Agency).

Pandemic Preparedness Index (PPI) is a project where we have developed a Composite Indicator that serves as a statistical tool to assess pandemic preparedness of a region. A large amount of mathematical modeling of the theoretical framework has been done using normalization, imputation, PCA, weighting, and aggregation. 25 original equations formulated by assigning new symbols are prepared for transparency and accountability. The method of building the indicator is generalized for N-dimensional datasets, hence making it more powerful. The results and the final scores of Asia, Europe, and the USA have been visualized using charts. We suggest that the Pandemic Preparedness Index (PPI) can cause a revolution in policy making through statistics.

To develop this project, the foremost task was to understand the mechanism behind the construction of composite indicators. We went through several documents and websites to learn the essence and principles to construct a composite indicator. After dividing the task among the team members, we began our journey of exploration, learning, and innovation. We learned Data Imputation to give credibility to the available data; Data Normalization to make the data comparable to each other; Physical Component Analysis to obtain a rotated component matrix to calculate the weights of the variables. Finally, we calculated the final scores of the data-specific regions (in our case: Asia, Europe, and the US) to compare their tumbled socio-economic status due to the COVID-19 pandemic.

Winter School on Fluid Mechanics

We organized a Winter School on Fluid Mechanics from February 20 to March 6, in association with the Global Sustainable Research and Development Center. The two-week-long winter school was designed to advance student's understanding of fluid mechanics. The targeted audience for this program were high school and secondary level students. The program offered an opportunity to study an intensive fluid mechanics course in an interactive and friendly environment full of students.

Achievements

ANPA Conference-2021

Our team of student researchers attended ANPA Conference-2021 for an oral presentation in the HEP/Nuclear symposium. Mr. Abhishek Karna gave a presentation on the detailed study of Delta Rays and their prospects in radiobiology alongside the co-authors Mr. Aaviskar Paudyal, Mr. Shaleen Kumar Dhital, Mr. Rahul Gupta, and Mr. Aamod Paudel. They talked about their research paper on Delta Rays on a global platform. The conference accompanied professors from all around the world with the keynote speech of Nobel Laureate, Dr. Joachim Frank where our team presented their research work to contribute to the realm of science extensively.

Financial Management Policies

We have developed financial management policies and procedures to establish guidelines for developing financial goals and objectives, making financial decisions, reporting the financial status of the organization, and managing the organization's funds. Mr. Saroj Shrestha from the Finance Department designed a financial policy form to ensure that all organizational assets are adequately protected.

Website Development

As our organization was taking a surge, we developed a website that describes us among the public and facilitates the internal surveillance of our organization. There are a total of 6 pages on our website with the content variation which aims to resemble our structure and performance in digital form. The website provides relevant input about our vision and works with updated blogs and notices. It holds the information of our members and the frequency between them is maintained through regular data collection. The website has become a prominent way of communication between our organization and the world community.

The web department of Ecstatic Paradox led the project with the back of the media department to build the website. The project was split up into 3 phases: designing, frontend, and the backend. At first, we took off different approaches to make our website look simple but elegant. We finalized the design after reviewing it with the media department. The second phase was to implement the design to appear on the web. Functionality and database development was done at last with proper testing by our security team.

Achievement of Beamline For Schools (BL4S)- 2021

Mr. Abhishek Karna, Mr. Aaviskar Paudyal, Mr. Shaleen Kumar Dhital, Mr. Rahul Gupta, and Mr. Aamod Paudel from Physics Department initiated their research work from January 2021 for the competition organized by European Council for Nuclear Research (CERN) which was to be held in DESY-II.

Their draft was an experimental proposal that was sent to CERN and was verified and awarded based upon their research methods and logically presented arguments. They planned to develop a clinical technology method for human use all around the world as a better way for treating Cancer and relevant illnesses. They anticipate identifying the following applications of δ- rays; it may have to revolutionize radiotherapeutic advantages over X-ray and other particle beam therapies due to its lower penetration range and penumbral dose distribution. Moreover, it is certain to not cause chromosomal aberration and mutations which are caused due to electromagnetic radiation. It might be used in ionomeric dosimetry, surface analysis by spectroscopy, ion-beam induced deposition, synthesis of new substances, and detection of new quantum particles.

The team is now finally seeing the results of their hard work done during the research of 4 months. Out of 283 participants throughout the world, they were able to secure the position on the top 26 teams. Their work was appreciated by numerous professors from Nepal and other parts of the world too. They will be getting their prize soon as assured by CERN and DESY-II.

Achievements

Editorial Board

We have developed our Editorial Policy that ensures all the guidelines and processes involved while publishing any academic or scientific journal, article, research paper as well as other descriptive material via our editorial platform. The collective subsidiary group made under our editorial team strives to adhere to all the required standards while publishing any of those fore-issued materials. Mr. Aamod Paudel from the Editorial Board designed the editorial policy form including consent and copyright form to ensure consistent branding across all published content.

Panel Discussion

Pedagogue Rahul Gupta conducted the panel discussion from June 2021. Members of the physics department were divided into 5 different groups of three. It was conducted according to our pedagogue. Each day a topic was assigned to the group. The topic was assigned so that members would get time to prepare for the panel. It was paused as most of the members were of grade 12 who had to prepare for the exams. It was very successful during that time. Every day even non participating members would learn something new. It will continue after the anniversary of Ecstatic Paradox.

Young Scientist Summit 2021

The research proposal written for the BL4S is considered one of the greatest achievements of the first year of Ecstatic Paradox. This proposal's abstract was sent to Sixth Young Scientist Summit-2021. Fortunately, our abstract was selected for the oral presentation where one of the authors should present the proposal in front of the jury. On August 7, 2021, as a presenter, Mr. Abhishek Karna explained the proposal in the meeting. Our hard work gave us the best prize. Mr. Abhishek Karna became the winner of YSS-2021 in the Physics category. As a winner, he became eligible to participate in the 10th Asia Pacific Conference of Young Scientists, which will be held from September 27 to October 1.

Attendance and Work Records

Attendance is taken every day to ensure the participation of each member in the organization. Data is collected and members are told to send proper reason in the case of absence. Similarly, work records are stored. This helps to maintain the feeling of unity among the members.

HR and Recruitment

Inside the Human Resource Department, we learned a whole set of different skills which has been the most productive learning and working phase inside Ecstatic Paradox. As a team, we formulated a Human Resource policy for the optimum utilization of the resources available to us.

The main purpose of it is to create a healthy working relationship among the members and a suitable operational environment. It helps us to ensure that the members comply with the rules & regulations of the organization.

For hiring proficient candidates, we worked to develop a recruitment questionnaire that was meant to evaluate them based on their merit, experiences, and relevance to the vacant position. Every member had to qualify through several stages which included an interview round with Human Resource Managers and Executives. After assessing every quality and skill depicted through the answers to the questionnaire & interview, 13 individuals were added to our visionary team.

Published 17 Articles

Our members published a total of 17 articles with unique and informative themes. With the motto of providing genuine information and knowledge about certain topics, we published articles that lured numerous people around the world.

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Uniting Physics and Tech
Designed with Love by Ayush Banjade, Media Manager.