OREPA

NEWSLETTER

Welcome to the Newsletter of
Old Royalists Engineering Professionals' Association

10TH EDITION
2020 – JUNE

CONTENT

OREPA Student Chapter

AGM

The Annual General Meeting of the OREPA Student Chapter was successfully held on 6th January 2020 at the RCU Skills Center. The meeting was called into order at 6.30 p.m. with the school anthem. Secretary's report for the preceding year was presented by Mr. Naveen Avishka at the start of the meeting which was followed by the Treasure's report for year 2019.

Afterwards Prof. J.M.S.J. Bandara - President of OREPA, addressed the meeting. He praised the outgoing executive board of OREPA Student Chapter for their contribution and emphasized the importance of accumulating growth by leaving something more than when you started. Next according to the agenda, hard work and commitment of several members were appraised through Letters of Acknowledgment and Tokens of Appreciation.

Moving on to the main event of the meeting, appointment of the new Executive Committee for the year 2020 was conducted by the former President of the OREPA Student Chapter, Mr. Kanchana Ranasinghe.

OREPA Student Chapter Executive Committee Members for the Year 2020

President	Binod Madhubashitha
Secretary	Indunil Uthpalanjana
Treasurer	Dulshan De Silva
Vice President	Pasan Kumarasinghe
Directors of School Projects	Lasan Manujitha
	Pasindu Sandima
Directors of Information Management and Marketing	Uditha Maduranga
	Yasas Guneratne
Directors of Public Relations	Ramidu Ranashanka
	Janith Bimsara
Director of Membership	Sahan Peiris
Directors of Events	Naveen Bandara
	Pramuka Mihishan

Year Plan for 2020 was then presented by the newly appointed Secretary, Mr. Indunil Uthpalanjana and the meeting was adjourned with the vote of thanks by the newly appointed President, Mr. Binod Madhubashitha.

Article by: Yasas Guneratne

ACADEMIC GUIDANCE

As a continuation of the prior sessions conducted under the Academic Guidance programme, OREPA has included to provide academic support for the freshly selected undergraduate Royalists.

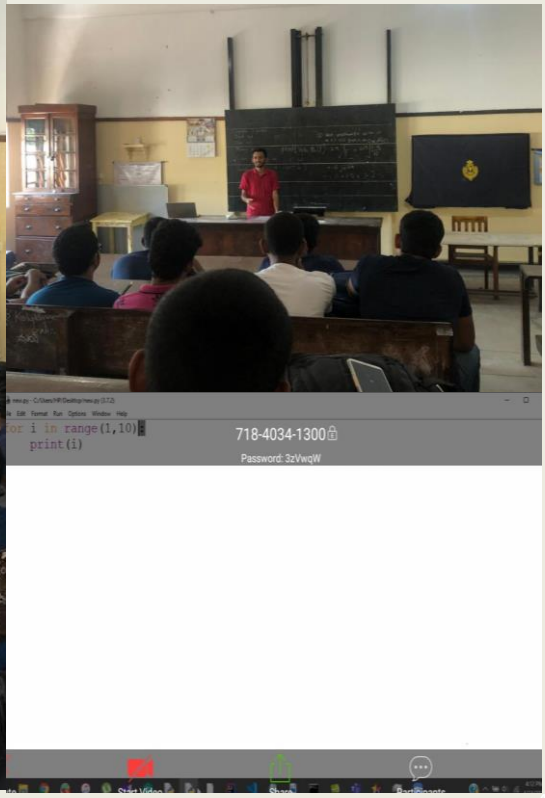
The Royalists of the 2019 Advanced Level batch were chosen as the audience for the endeavor. The programme is headed by Mr. Chamod Gihantha and Mr. Ransara Wijerathne of 2018 A/L batch.

With all engineering subject courses in universities embracing programming as a necessity, the academic guidance project started off by conducting lessons on Python programming. The programme managed to conduct two successful sessions on online basis with the help of Zoom video conferencing platform.

This is primarily focused on enhancing the first semester results of our students and the target of the committee is to expand the programme, offering support in Mathematics modules in addition to Python programming.

In the interest of OREPA to enhance the good name of the College through Young Royalists, the Academic guidance programme seems sure to pay dividends.

Article by: Dharmanuwan Senanayake



PATHWAY TO ENGINEERING AFTER O/Ls

As a guiding hand to young Royalists, OREPA has taken on yet another initiative to motivate and encourage after O/L Royalists.

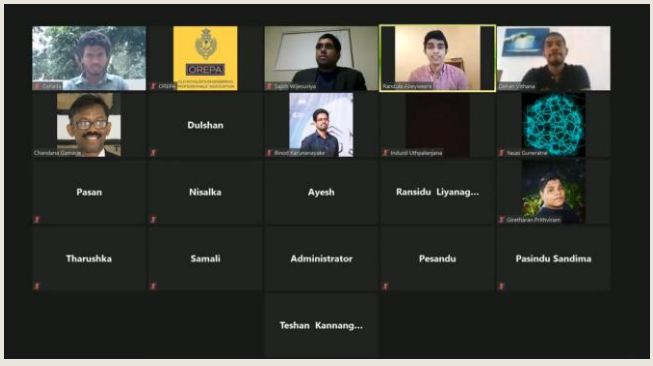
Aptly titled, "A pathway into engineering after O/Ls", the project was carried out in the format of a webinar discussion via Zoom video conferencing platform. The session took place on the 16th of May from 10 a.m. onwards. For the benefit of many interested parties, the programme was live streamed on the official Facebook page of the Old Royalists Engineering Professionals Association.

The discussion was focused on providing guidance to after O/L students who are eager to follow a path in Engineering and to provide them with insights on how they could become successful engineers.

The session was moderated by Mr. Randula Abeyweera. The discussion panel held prominent members of OREPA, namely Dr. Chandana Gamage, Dr. Sajith Wijesuriya, Mr. Dehan Vithana and Mr. Oshada Jayasinghe.

The programme concluded in a resounding success with a Q and A session at the latter half.

A summarized video of the entire session is available at the official Facebook page of Old Royalists Engineering Professionals' Association for further reference.



Article by: Dharmanuwan Senanayake

Dr. Chandana Gamage
Senior Lecturer,
University of Moratuwa
PhD in Computer Science

Dr. Sajith Wijesuriya
Researcher, National Renewable Energy Laboratory, Colorado, USA
Founder, Science Policy Circle

Mr. Dehan Vithana
Senior Executive,
Data Science and Analytics
MAS Intimates (PVT) Ltd

Mr. Oshada Jayasinghe
2012 O/L and 2015 A/L Island 1st

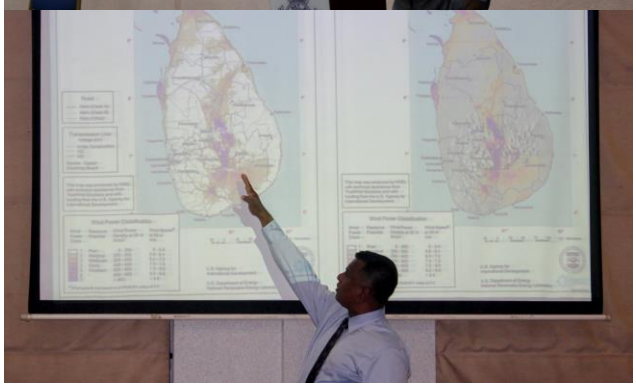
ENGINEERS in INDUSTRY

As a continuation of the tech talk series, Engineers in Industry was conducted for the 3rd time on 11th of February at the Royal College Union Skills Center. Eng. Prof. Mahinsasa Narayana who is a specialist in the field of wind energy harvesting was invited to conduct a session on "Introduction to Wind Power as Source of Energy". Prof. Narayana is an old boy of Royal College ('85 group) and a graduate of University of Moratuwa with a PhD in Renewable Energy from North Umbria University, UK. He specializes in process modelling and simulation, computational fluid dynamics, wind turbine performances and wind resource assessment, and many other related fields.

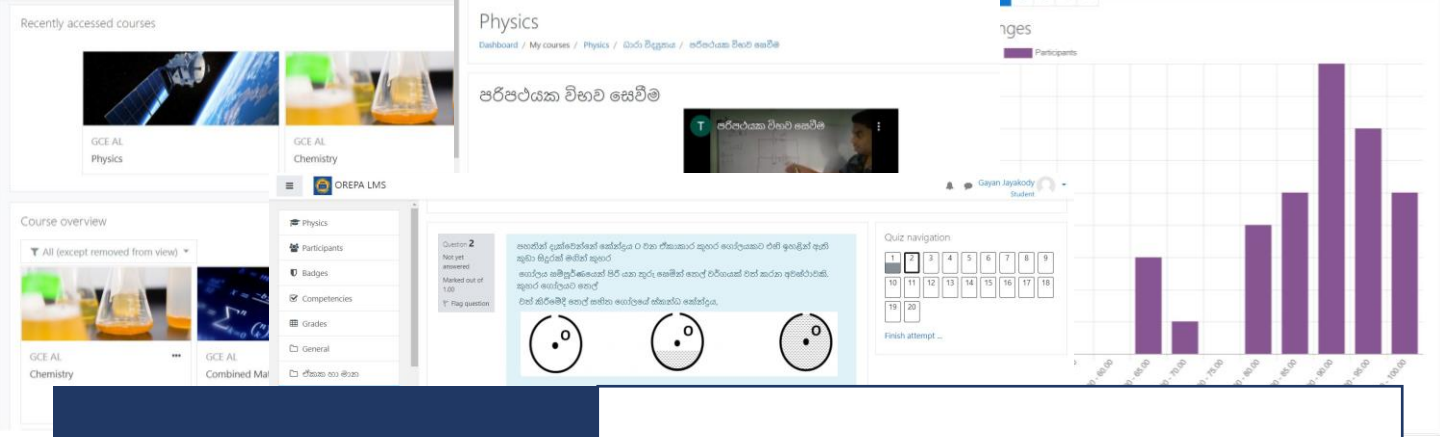
Before diving into the wind energy harvesting and all other technicalities, Prof. Narayana explained to the audience the basic principles related to the wind formation. Phenomena such as the Coriolis effect and temperature variations around the globe were clarified in order to explain the wind pattern formations.

Later, in the session, Prof. Narayana mentioned why wind should be considered as a major in the renewable energy sector. Harnessing wind energy has lower impact on the environment when compared to other energy sources due to its zero emissions and lower damage to the surrounding upon construction. Wind energy is also able to compete with conventional energy sources such as fossils in pricing per unit. Under these circumstances Sri Lanka is aiming for a 20% contribution from renewable energy sources by the year 2030. Prof. Narayana thereafter mentioned that through mathematical modelling they can predict wind patterns of the world, and that currently Sri Lanka is experiencing a gain in wind speeds for up to 30 years. This is a favorable condition. But unfortunately, our grid is lacking the technology to absorb peak powers generated by wind. It is one of the main barriers for installing more and more wind farms in Sri Lanka.

Evolution of wind turbines and mechanical engineering aspects of them were also discussed in detail. Finally, the session concluded with a Q and A session, where the participants were able to gain even more insights on wind power generation.



Article by: Yasas Guneratne



Learning Management System

OREPA LMS was initiated by OREPA Student Chapter with the aim of providing an extra guidance for A/L students of Royal College. Currently the Learning Management System provides 2 main facilities for the G.C.E. Advanced Level Physical Science & Bio Science streams students.

I) GCE A/L MCQ Portal
II) Online Revision Sessions

The main objective of this initiative is to provide the necessary learning materials along with the experience the undergraduates have in A/L examination. The target of the MCQ portal is to give a relevant and fundamental idea about the subjects. These MCQs are presented as chapter wise quizzes where time taken by a student for a quiz will be recorded and the teachers will be given insights on the performance of students

The questions added to the portal are sourced either from school past papers or from OREPA Student Chapter members .

The uploaded videos, which are 15-20-minute long, are quick recaps of Maths, Chemistry and Physics lessons conducted by the Opera Student community.

This portal can be accessed through **lms.orepa.lk.** Accounts have already been created for the Grade 13 students and the usernames and passwords have been distributed to them through the class teachers. These quizzes are presented in Sinhala language while English and Tamil medium quizzes are planned to be added in the near future. In addition to these, OREPA is currently working on a third segment - OREPA Exams, where timed model papers will be uploaded.

This is an initial step taken towards improving the academic standard of the college through Virtual Learning facilities.

Article by: W.P. Pallewatta

An Interview with

Mr. Kalana De Silva

He is and Old Royalist of 2008 Group. He was a founding member of the leading Sri Lankan tech company, Paraqum Technologies (Pvt) Ltd headed by Dr. Pasqual and is currently working in Singapore Technologies Engineering Ltd as a Senior Engineer in TeLEOS 2 Satellite Project.

Everyone rejoices their school days. What was your experience as a Royalist, and how did it help you to mould your personality?

It was 25 years ago, that I entered Royal College as a 5-year-old kid. I spent the next 13 years over there until I finished schooling in 2008. So it's fair to say that most part of my childhood revolved around Royal College. And I believe the school had a great impact in shaping my future. It's a place where you get to meet a diverse range of people from all over Sri Lanka and make lifelong friendships. Whether you want to excel in science, arts, sports or leadership, Royal College will provide ample opportunities for everyone to learn and grow to become successful in their chosen profession. From a young age, I discovered that my skills were mainly in math and physical science. So I chose to follow that stream. But the overall education and experience I got from Royal college was not limited to that alone. It was rather an all-encompassing and enriching experience. True to our motto, it's where we "learn of books and men and learn to play the game". To this day, I cherish those memories and I am proud to be a Royalist.

If you were to describe the time spent at University of Moratuwa, how would you describe it?

I entered the University of Moratuwa in 2009. By that time, I had decided that I'm going to be an electronics engineer, so I followed that stream. At the university, I really learned how to become an engineer, both through knowledge and practice. This is a place where you get plenty of opportunities to learn and enhance your skills. In addition to lectures, you also get the chance to learn through projects, competitions and industrial training opportunities. I also got to meet other like-minded friends and work together with them in many exciting projects. It was also a great opportunity to make lifelong friendships. In addition to all that, the university life was quite fun. We got lot of freedom to travel around with friends and enjoy ourselves. This was a time right after the end of the war, so the whole country was experiencing a sense of freedom like we haven't had before. Overall it was a great experience.

Many fresh graduates face dilemmas when it comes to choosing their career path. What type of dilemmas did you face and how did you overcome them?

Yes, up until graduation the path is well defined and understood. But thereafter, it's pretty open ended. By the time you graduate, you would usually have a solid foundation of technical knowledge. But you won't quite have the skills and practice to match that. That's ok as this is normal. After graduation, you get the chance to build up your skills and experience through engaging in real world engineering practices.

As for me, I also faced some dilemmas at this stage. On one hand, many people recommended me to pursue an academic career because I had a very good academic record and I was also accustomed to teaching. I found this to be an attractive option. On the other hand, I also wanted to experience the industry because I thought that's where most of the action is when it comes to engineering. So I was contemplating which path to take after graduation. In the end, I decided that I should first enter and experience the industry, before making up my mind about my final career choice. But my entry into the industry took a more unconventional route, as it happened by means of a startup company.

You were among the founding members of Paraqum Technologies. What was the Vision behind this startup?

It was a bit of an unexpected move for us too. The idea of this startup first came from our final year project supervisor Dr.Ajith Pasqual. It was during one of our project meetings in the last couple of months of our final year. At that time, our project team, which included myself and 3 other friends, have been working on a video compression engine. We were a very strong team and we had achieved some impressive results by then. I remember we had a conversation one day with our supervisor Dr.Pasqual in one of the project meetings. He spoke about the need to come up with new startup companies in the electronics sector to promote a culture of innovation and entrepreneurship amongst our graduates. He went on to note that some people should rise up and take a bold step in order to make these ideas a reality. Considering the results we had shown thus far, we spoke about the possibility of commercializing our work by converting it to a product. In the end, he said he is willing to form a company from his own money if we would agree to join with him. So we thought about it and we also believed we had the capability to make it happen. Plus, it was a need of the hour, and if successful it would greatly benefit the electronics industry and the country as a whole. At that time there was a lot of encouragement from the university as well for fresh graduates to form their own startups. To create new jobs instead of being job seekers. So we decided to go for it. Needless to say, this was a risky move and we knew it wouldn't be a popular choice. Nevertheless, we went ahead with it and right after graduation in 2014 we went on to form Paraqum Technologies. I spent the next 4 and half years heading the product development over there. It was a great experience for me, and I got to see plenty of action. We went on to release some good products into the market and were able to export them as well. In fact, most of our products and services were export oriented. We provided new job opportunities to our engineers and contributed to the foreign export earnings of the country. By the time I moved to Singapore in 2018, we had over 30 engineers working there, and a number of products established in the market. While we didn't turn out exactly like those big Silicon Valley startups, looking back I'm very happy with how far we have gone.

You are currently working on a satellite project for ST Engineering Ltd. How did you come to be a part of it?

That was kind of a coincidence. I moved to Singapore in mid-2018, in order to pursue a Masters in Engineering at the National University of Singapore. While I was there, I was encouraged by a good friend about working in Singapore for a while to get some good experience. So when I was about to graduate, I started looking around to see what kind of opportunities are out there. ST Engineering is one of the biggest companies in Singapore, involved in many leading commercial and defense projects. So I knew about this company, but I had no idea that they had a satellite program at the time. In 2019 there was a career fair at NUS, which I attended. ST Engineering was also there at the career fair, so I went and spoke to them out of interest. While they didn't mention anything specific about the satellite program, they said they have many positions available for electronic engineers among their various projects and asked for my application. So I handed over my CV, but I wasn't really applying for any specific project or position. I don't know how it exactly happened after that, but somehow my CV had gone to my future boss who was managing the satellite program. A few days later, I got a call from them saying that they are interested to meet me. So I went to their facility and that's when I first learned about their TeLEOS satellite program. They explained to me about the satellite they are building and what part I would be expected to contribute. I have been interested in the field of space engineering from a young age, but I have never had the chance to work on such a project. So naturally, this immediately drew my interest. After a couple of interviews, they offered me a job and said I could join them right after graduation. So after graduating in mid-2019, I joined ST Engineering as a Senior Engineer working for the TeLEOS Satellite Program.

What is your role/contribution in this project?

I currently hold a Senior Engineer position. I work mainly on the electronic systems on board the satellite. The satellite has several on-board computers and other data processing units. These modules are custom designed and built according to aerospace standards. My contribution goes into these modules. Due to confidentialities, I cannot go much in to details regarding my work

Could you give us an idea about the nature and the magnitude of this project so as to get a clear perspective on it?

This is part of the TeLEOS Satellite Program. Singapore's first commercial satellite program. ST Engineering is building and operating these satellites as part of the program. The first satellite under this program is called TeLEOS-1, which was launched in Dec 2015. That was Singapore's first commercial satellite. It is currently operational, orbiting the earth 550 km above. The satellite we are building right now is called TeLEOS-2, which is the second satellite under this program. It is scheduled to be launched next year. Both satellites are Earth observation satellites, used for satellite imaging and remote sensing applications. They will both orbit the earth around 550 km above the surface in a near-equatorial orbit, which means they will cover the area around the equator. While TeLEOS-1 has a high-resolution optical camera, TeLEOS-2 will feature a synthetic aperture Radar, which will enable it to take images during both day and night, under all weather conditions. Together, these satellites will provide quick-time monitoring for many applications such as shipping, urban development activities and disaster management.

We are pretty sure that this type of project comes with its own difficulties. What type of new experience did you gain by facing them?

Yes, there are many challenges to overcome for a space grade design. Before this project, I had done many projects at Paraqum Technologies for around 4.5 years. So I did have a good product development experience. But this project was unlike anything I had worked on before. All our modules must conform to strict aerospace grade quality standards. Once they are in space, they have to operate continuously for over 10 years with zero maintenance. These modules have to operate under some harsh space environment conditions, including a high amount of radiation that can be particularly damaging to electronic components. So we have to employ special design techniques to mitigate these risks. And the amount of screening and testing we need to do in order to qualify a product for commercial space flight is pretty intense. This is one of the major reasons for the long development cycles in aerospace projects. All these things were a new experience for me, and I learned a lot by going through this experience.

As a final note, what would your advice be to graduates and undergraduates who are hoping to join the industry.

I haven't spent a whole lot of time in the industry yet. So I'm also still learning many things. For those who hope to join the industry as engineers, I would advice them to gather as much real-world experience as possible, while also staying on top of their studies. You can do so by engaging in projects, doing internships and taking part in engineering competitions etc. It is important to note that engineering is a practice-oriented profession. It is a culmination of the knowledge you learn by studying, the skills you train by doing, and the experience you gain by both succeeding and failing. Engineering is not found inside the pages of a book or text on a screen. Engineering exists out there in the real world. We need to get out there to experience it.

Sri Lankan Innovations for COVID – 19

This article is written on the objective of shedding light on the innovative thinking of Sri Lankans in times of adversity such as this global pandemic

Article by : Kavindu Collure

1

Atlas AGV Robot

An Automated Guided Vehicle(AGV) that has the capability of assisting the medical personnel in the fight against the pandemic has been developed by the Atlas Engineering Tech team of Atlas Axillia PLC and gifted to the Homagama Base Hospital. This AGV is cable of transporting food and medicine to patients, performing basic medical check-ups such as temperatures checks ,assisting doctors in monitoring patients remotely through the camera mounted on it and is capable of charging itself using a wireless charging port , further reducing the requirement of physical contact. The usage of this AGV helps healthcare workers manage the crisis more efficiently.

2

Low cost Medical Ventilator

A new low cost easily scalable medical ventilator is developed by Vega Innovations, a subsidiary of CodeGen Group of Companies and is in the phase of testing at the time of writing. With a typical ventilator costing approximately USD 30,000 per unit, the team at Vega managed to develop a scalable ventilator in 10 days ,which can be produced under a cost of USD 650 per unit. Operating in the Volume Controlled – Continuous Mandatory Ventilation (VC-CMV) mode, this ventilator is used to treat Corona virus patients in the critical phase. This ventilator has been designed by taking the drawbacks of the Ambu bag ventilator into consideration and adding vital features needed to revive patients at full-tilt.

3

UV-X (Ultraviolet Germicidal Robot)

The UV-X Germicidal Robot is the result of a collaboration between Sachith Kasthuri , Tharindu Suraj , Pasan Miyuranga and Charith Jayaweera ; a research team from the University of Moratuwa. Moving away from the traditional liquid disinfectants, this device utilizes UV rays for the disinfection process. The robot was tested at the Microbiology lab of University of Kelaniya to validate the disinfection process where it was able to achieve a microorganism reduction percentage of 99.998% under 10 minutes. Importation of a device of this nature would cost around 300 lakhs whilst the device made by this team can be manufactured under 10 lakhs. The team expects to use this technology to disinfect hospitals and public places in the country

4

NanoSterile

NanoSterile is a transparent antimicrobial coating developed by Sri Lanka Institute of Nanotechnology (SLINTEC) that can be applied upon surfaces in order to reduce the risk of the virus spreading through surface contact and air. Once applied on a surface the coating sterilizes both the surface applied on and the air surrounding it. Due to the transparency of the coating both surfaces with designs, logos and plain surfaces can be protected. SLINTEC has utilized this patent pending product to treat the office space of CodeGen International in Colombo in order to help the company get back to work. The company recommends the usage of this coating in hospitals, hotels, supermarkets, office spaces and factories , banks and ATMs.

5

Covid-19 test swabs

Currently testing for COVID-19 is carried out using Polymerase Chain Reactions(PCR), and swabs required for this have been in shortage. SLINTEC has been able to reverse engineer the COVID-19 testing swabs. This special type of swabs can extract a biological sample from deep inside a person's nose/throat and release it to the testing liquid. These swabs are the only Sri Lankan made swabs that are approved by the National Medicines Regulatory Authority (NMRA) for use in COVID-19 testing. This has been developed by SLINTEC in collaboration with the Medical Research Institute Sri Lanka, Lady Ridgeway Hospital for Children and Hi Fashion Holdings, who are producing 3000 swabs per day

6

Next Ayubot

Next Ayubot is a medical assistant robot with a medical database of over 200 diseases. The robot is able to provide advice for diseases such as fever, cough, backpain and also provide preventive measures for diseases such as high blood pressure and gastritis with the use of a unique AI module. Developed by Pamuditha Premachandra , this device is able to be controlled remotely over the internet. Perhaps the most unique feature of this robot is its capability of recognizing and speaking in the Sinhala language. It is also cable of detecting fire hazards through analyzing the temperature of the environment and the composition of air.

7

Remote Control Ward Round Trolly

A group of students from the University of Vocational Technology has developed a remote-control ward round trolly with the intention of minimizing the contact between COVID-19 patients and the medical staff treating them. Through this device the doctor is able to communicate with patients and perform consultations remotely. The device also has the capability of transporting the food and medicine that is required by patients.

8

PCR Machine

Ushan Sakuntha, alumni of the University of Sri Jayewardenepura and the University of Vocational Technology has developed the first Sri Lankan PCR Machine. Currently this device is capable of performing 12 tests at once with the possibility of scaling up to 25 tests per instance.

Since the PCR test consumes a large amount of time, the aim of the developer has been to create a device which can perform a large number of tests at once. While the market price of a device of this nature exceeds Rs. 300,000 , this PCR machine has been developed with a cost of Rs.10000.

9

Votex 2020

A team of researchers consisting of Pasindu Dilhara from the Rajarata University , Vishen Dias from the Wayamba University and Harsha de Siva from SLIIT teamed up to create Votex 2020; a nursing assisting robot. This has been developed with the intention of minimizing physical contact between medical workers and COVID-19 patients. This robot facilitates communication with the patient via a remote control and can transport up to 20kg of product to a patient. This device has been handed over to the Teaching Hospital of Karapitiya.

10

Disinfection Mini Hospital

The Disinfection Mini Hospital is the brainchild of Lahiru Gomes, First year student of the Rajarata University. This device is capable of measuring the body temperature of an individual as he/she walks through it and provides a warning if the temperature is higher than normal. Similarly it also measures the heart rate giving a warning if it is higher than normal and is followed by the measure of the oxygen saturation level providing a warming if it is below the normal levels. If an individual is successfully tested without any warnings, the process of disinfection takes place. This system is currently utilized by the Ganemulla police station.

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https://orepa.lk/newsletter/

"OREPA, as a host of technical experts in many facets of engineering and related fields, opens up a reservoir of knowledge, technical expertise and material support in the fields of engineering, architecture and related fields for the benefit of the students and the youth. OREPA is looking forward to become a key stakeholder of the Royal College and the community. This professional newsletter provides news on our projects, events and achievements to promote sustainability and youth empowerment within and beyond Royal College."

Please send your thoughts and insights to empower our initiatives;

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