Section Name **Reporting Officer Name**

Section Vitality

Please provide information about the date of last Section elections, date of next elections, and do you have the practice of Vice-Chair becoming the next Section Chair. Section ExCom meetings (list them and provide brief summary if appropriate). List the activities carried out to retain and recruit members and the results obtained.

The last Section elections have been carried out on 24 September 2021 for the term 2022-2023. A new team of volunteers have been elected. The next elections will be organized within 2023 and carried out by the end of the year 2023.

The new team is planning a number of events for the coming year. The Mauritius Section has been active during the past year with a number of events organised together with the two SBs and one Chapter.

ExCom meetings were held for the following matters: Interim Chair, 2021 ExCom Election, R8 Seminar, Section Rebate R8 Summit, Budget allocation to Std Branches and PES Chapter, Financial procedure, AGM planning, Awards AGM presentation Treasurer's Report, MDO Report, Student Branch Activities, Chapter Activities, PES Call for Nominations, ExCom Election Process, Awards PES Chapter Election / Nomination Committee, Award Ceremony, ExCom Election voting, R8 Seminar Awards Certificate and Shields, Appointment of new officers, Finalise Budgets for Student Branches, SYP and Chapter, EoY Event

To retain and recruit members, one new SB (IEEE Middlesex University Mauritius Campus SB) and one new Chapter (Mauritius Chapter for IEEE Antennas and Propagation Society) have been created and the Section will also increase the number of activities so as to sensitize potential members to join. At the beginning of the year, we were just 117 Members, compared to where we started 10 years back (about 40 members), and I am grateful for starting 2022 on a very positive note with 136 members. We look forward to getting more members in the coming year.

Students

List of Student Branches (SB) in your Section, the newly formed or dissolved SBs, if any since the last meeting reporting (Oct 2020). List the student meetings held and Section activities addressed to Students and Young Professionals.

We have three active SBs, namely the University of Mauritius SB, University of Technology Mauritius SB, and IEEE Middlesex University Mauritius Campus SB.

The list of the student events is given below.

List of events of UoM SB

Event 1: PES Day Webinar1 Topic: "The Contribution of Gen-Z Engineers in The Realization Of Power System Transformation"

Event 2: Talk on IoT and Smart Home organized by UoM Oracle Club in collab with IEEE UoM SB and IMechE UOM Students' Chapter Topic: "Internet of Things and Smart home"

Event 3: Remote Sensing in Agriculture organized by UoM Oracle Club in collab oration with IEEE UoM SB and Faculty of Agriculture Topic: "Remote Sensing on Agriculture"

Event 4: PES Day Webinar Topic: Renewable Energy in the Clean Energy Revolution

Event 5: PES Day Webinar 3 organised by IEEE UoM SB Topic: The growing importance of power system flexibility in the Clean Energy Revolution

Event 6: PES Day- Article Writing Competition Topic: “Challenges Faced by the Clean Energy Sector in Mauritius Further to Covid-19 Impacts”

Event 7: PES Day- Photography Contest The theme is "Use of clean Energy and being sustainable at home during lockdown".

Event 8: EEE E-Open Day

Event 9: Promoting of entrepreneurial spirit at the Faculty of Engineering

Event 10: IEEE Day 2021

Event 11: PES DAY 2021 AWARD CEREMONY

Event 12: Mass Recruitment Event

Event 13: Celebration of International Women in Engineering Day

Science/Engineering show

Women’s day Celebration

WomenTech Network

Event 14: FoE Community App

Event 15: Circular Economy Principles and Applications

Event 16: Occupational Health and Safety Awareness for Engineering Students

Event 17: FoE Community App

Event 18: Introduction to AI and its Applications

List of events of UTM SB

- Dissertation Workshop
- IoT Festival session 8- IoT & Cloud edge computing
- IoT Festival session 7 - IoT in Industries
- IoT Festival session 5
- IoT Festival session 4
- IoT Festival session 3
- Meeting for Planning
- IoT Festival session 2
- IoT Festival
- Java Coding Session 3
- Java Coding Session2
- Java Coding Session 1
- Python
- From Dark Web To Crypto
- Traditional vs Agile software Development
- Virtual ICT Campus Recrupment
- Article Writing Competition
- EEE E-Open Day
- Introduction of IEEE
- Green computing with virtualizing technologies

Affinity Groups

List of Affinity Groups (YP, LM, WiE, SIGHT, etc.), list of SB AGs, newly formed or dissolved AGs/SB AGs, if any since the last meeting reporting (Oct 2020). List the activities intended to support affinity groups.

IEEE Mauritius Section Students and Young Professionals Affinity Group

Chapters

List of Chapters and SB Chapters in your Section, the newly formed or dissolved Chapters, if any since the last meeting reporting (Oct 2020). Indicate how many have reported on time and received rebate. Highlight some of the activities.

Formation of a Mauritius Chapter for IEEE Antennas and Propagation Society (AP-S)

The Mauritius Chapter for IEEE Antennas and Propagation Society was formed on 26 June 2022. The geo-code is CH08901.

The IEEE Mauritius Section – Power and Energy Society and Systems Council Joint Chapter has received the IEEE Region 8 Chapter of the Year 2021 Award in the small chapter category

Activities

1. **CYBERSECURITY CURRICULA RECOMMENDATIONS FOR SMART GRIDS by Dr. Andrejs Romanovs**

Date: 15 August 2022

Cybersecurity is defined as one of EU strategic digital capabilities, based on Europe's collective resilience against cyber threats and ensure that all citizens and businesses can fully benefit from trustworthy and reliable services and digital tools. The EU Cybersecurity strategy covers the security of essential services, including energy grids and the ever-increasing number of connected objects in citizens homes, citizens' and offices factories. The past years have been decisive about the paradigm shift that happens in the field of the energy sector. Power systems are expanding, getting ready to accommodate the wide use of electric vehicles and energy production becomes more distributed with the use of renewable energy sources like photovoltaics and wind turbines. These changes can only happen in a grid that remains reliable if they are accompanied by the almost-real-time exchange of information with which the grid is regulated. As energy systems will adopt emerging information technologies, cyber criminals will have new attack surfaces to exploit. There has been a massive increase in the number of successful cyber attacks last years, especially on electricity networks such as smart grids interconnect vast number of users and energy transmission systems. To summarize, the high rate of information exchanged, the rise of the potential attack points and the increased value of the data that is being exchanged create the need to have a workforce that is trained in the combined field of Power Systems and Information and Communication Technologies. The presentation giving a general overview and first results of the Erasmus+ funded project "Cybersecurity Curricula Recommendations for Smart Grids", developed by leader of Consortium University of Vaasa (UVA), Finland, Riga Technical University (RTU), Latvia, University of Oldenburg (UOL), Germany, and National Technical University of Athens (NTUA), Greece. The objectives of this project are (i) higher education study programs in smart grids adopt cybersecurity learning outcomes and (ii) organizations dealing with smart grids train their professionals in cybersecurity issues. Currently identified skill gaps in the field of cybersecurity in smart grids will be discussed as well as directions for the relevant stakeholders on how to train the current and future workforce in the subject of cybersecurity in smart grids.

2. MDX LINE FOLLOWING AUTONOMOUS ROBOTICS COMPETITION

This was the second edition of the robotics competition being organised by Middlesex University Mauritius. It was opened to HSC holders and students who haven't joined a university yet. This time, the competition has been splitted in three parts due to the high number of participating teams.

First Part

• 25th July 2022 - Introduction to the hardware part of the robot. Assembling the different parts of the robot

• 26th July 2022 - Introduction to programming part of the robot. Testing on track.

• 27th July 2022 - Semi-final day where 12 teams competed on a challenging track.

Teams had 5 trials, among which, the first 3 best laps in terms of timing were averaged giving the final time. The first 10 teams with the best timing moved to the final.

Second Part

• 1st August 2022 - Introduction to the hardware part of the robot. Assembling the different parts of the robot

• 2nd August 2022 - Introduction to programming part of the robot. Testing on track.

• 3rd August 2022 - Semi-final day where 10 teams competed on a challenging track.

Teams had 5 trials, among which, the first 3 best laps in terms of timing were averaged giving the final time. The first 8 teams with the best timing moved to the final.

Third Part

• 5th August 2022 - Final day where 18 teams competed on a Formula-1 track.

Teams had 3 trials, taking best 2 in terms of timing and were averaged. The best timing was awarded a cash prize of Rs 30,000 + a shield + certificate of participation + goodie bags. The first-runner up was awarded the same but with a cash prize of Rs 15,000.

The IEEE Middlesex University Mauritius Student Branch mentored the competition and assisted teams of 3-5 participants in learning C programming (foundation level), building the autonomous robot and leading teams into winning the competition.

The event attracted local media. They had an interview on the Student Branch and IEEE.

3. WORKSHOP ON MULTIPHYSICS AND SYSTEM DESIGN OF INTEGRATED CURRENT IC SENSORS: SIMULATION AND MEASUREMENT CORRELATION by Dr. Rajen Murugan

Date: 26 Jul 2022

Current sensors are ubiquitous these days. A current sensor is a device that senses and detects electric current and generates a proportional signal. Application areas range from industrial, automotive, consumer electronics, medical, and telecommunication. There are different methods to sense and measure current. The optimal choice is generally a compromise between accuracy, type of measurements - DC and/or AC, performance requirement, application at hand, and cost. The key factors driving the current sensor ICs market are high integration, low form-factor, reduced power consumption, and cost-effective build of materials (BOM). While beneficial, integration leads to multiple integrated circuits (IC) design complexities that

compromise performance. The electromagnetic interactions of the system (viz. Silicon, Package, and PCB) and the need to concurrently consider multiphysics are co-design challenges that need to be addressed upfront. To that end, the need for robust modeling and analysis design methodology is critical to assessing desired performance early in the design phase while keeping costs down.

This presentation reviews the development and implementation of a multiphysics system co-design methodology for designing high-performance, cost-effective current sensors. The methodology is validated against silicon laboratory measurements made on two IC current sensor types - a precision shunt resistor sensor integrated into a voltage-output current-sense amplifier and on a high-precision, high-voltage (±600V) Hall-Effect current sensor. Design guidelines and recommendations for current sensors are also provided.

4. WORKSHOP ON DESIGN AND INTEGRATION OF ANTENNAS ON COMPLEX PLATFORMS

Date: **08 Jun 2022**

The EEE Department in collaboration with the IEEE Mauritius Section organised a hands-on workshop on the "Design and Integration of Antennas on Complex Platforms" on Wednesday 8th June 2022 in the Communications Lab. The workshop was delivered by Dr. Naveen Kumar, Assistant Professor at the Christ University in Bengaluru, India.

5. WORKSHOP: A LOW-COST REAL-TIME ROAD SURFACE CONDITION MONITORING AND ALERT SYSTEM

Date: 25 Apr 2022

A team at the University of Mauritius, comprising of members from the Faculty of Engineering (Dr V. Bassoo, Dr Y Beeharry, Assoc. Prof. (Dr) T P Fowdur and Mrs R Ramjug-Ballgobin), have completed a research project entitled “A Low-Cost Real-time Road Surface Condition Monitoring and Alert System” which was internally funded. This research aims to develop a low-cost device that can be installed on any four wheelers vehicle to collect data from different sensors, which will be used to assess road quality and provide alerts to road users and information to the relevant authorities.

6. IEEE PES DAY 2022 SEMINAR: "POWERING A SUSTAINABLE FUTURE"

Date: **23 Apr 2022**

The IEEE University of Mauritius Student Branch invited IEEE Mauritius section to a seminar to commemorate the 5th IEEE PES DAY 2022 with the theme "Powering a Sustainable Future", followed by a round table discussion.

7. HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS FROM WIRELESS COMMUNICATION DEVICES: FROM 1G TO 5G by Dr. Vikass Monebhurrun

Date: **13 Apr 2022**

The International Commission on Non-Ionizing Radiation Protection (ICNIRP), a body recognized by the World Health Organization (WHO), established the guidelines for limiting human exposure to electromagnetic fields in 1998. Based on the review of the scientific literature available at that time, the guidelines provide protection against the known adverse health effects of electromagnetic fields. The limits recommended by ICNIRP have been adopted in Europe and many countries around the world. IEEE has also developed and maintains a standard for the safety levels with respect to human exposure to electromagnetic fields. To further address the problem of possible health effects due to

the exposure to electromagnetic fields, extensive research has been undertaken by international laboratories in the fields of biology, dosimetry and epidemiology during the past decades. The biological effects of electromagnetic fields are usually well-known and scientifically recognized, but the adverse health effects on human beings are frequently debated. Following the review of epidemiological studies that showed a possible correlation between the extensive use of mobile phones and an increased risk for glioma, the International Agency for Research on Cancer (IARC), a specialized agency for the WHO, classified exposure to radio frequency electromagnetic fields as possibility carcinogenic to humans (Group 2B) in 2011. More recently, ICNIRP and IEEE have updated the guidelines and standard for limiting exposure to electromagnetic fields. The aim of the talk was to provide a review of the current state of the art on human exposure to electromagnetic fields from wireless communication devices present in our daily environment. The rationale of the guidelines and standard for limiting human exposure to electromagnetic fields, the limits adopted by the different countries around the world as well as the international standardization activities were discussed.

8. WEBINAR ON CYBERSECURITY IMPLICATIONS OF THE RUSSIA-UKRAINE CONFLICT

Date: **29 Mar 2022**

Main Resource Person: Dr. Amreesh Phokeer

Dr. Amreesh Phokeer joined the Internet Society as the Internet Measurement and Data Expert in April 2021. He is focused on efforts around Internet measurement, Internet shutdowns, and understanding market trends that impact the growth of the Internet across the globe. Prior to joining ISOC, Amreesh was a Research Manager at the African Network Information Center – AFRINIC, where he spearheaded the organization's research activities in the areas of Internet security and Internet measurement. Amreesh holds an M.Sc in Information Security from Royal Holloway, University of London and a PhD in Computer Science from the University of Cape Town, South Africa.

9. FROM POWER SYSTEMS TO ENERGY SYSTEMS:- IS THE AGE OF ENERGY MANAGEMENT COMING? By Prof. Khalil Elahee

Date: 17 Feb 2022

If power is interrupted, you will not manage to follow the proposed online webinar. You may have sufficient power stored in the laptop or phone battery, but the internet may not have a back-up supply. With the climate change challenge and the pandemic threat, the need for so-called resilience has been often evoked. The key objective is to achieve holistic sustainability in the face of political, economic as well as environmental constraints. In concrete terms, whilst specialists are more important than ever, an interdisciplinary approach is critical. It is about moving from a Power Systems paradigm to an Energy Systems one. The field of Energy Management was first introduced about twenty years ago to ensure this transition, among other possible aims. Is it coming of age finally?

Industry

List the activities carried out to foster relations with Industry and the results obtained.

The Section has worked in close collaboration with industry and has invited professionals from industry to deliver talks and webinars and participate in workshops as listed in the above Students and Chapters sections of this report. We look forward to strengthen the collaboration with industry for future activities.

Activities since the last report

Highlight some of the activities in your Section, with special attention to the things that work well, and things that don't, so that your acquired know-how can be used by other Sections.

The IEEE Middlesex University Mauritius Campus SB became active.

Several activities have been carried out by the IEEE Mauritius Section, as well as the UoM and UTM Student Branches. Other activities have been planned by the IEEE Middlesex University Mauritius Campus SB.

Planned activities

Highlight some of the future activities and initiatives in your Section.

We will be sponsoring the 4th International Conference on Emerging Trends in Electrical, Electronic and Communications Engineering (ELECOM 2022) and the 2022 3rd International Conference on Next Generation Computing Applications (NextComp) which will be held in Mauritius. We will also be sponsoring the 2022 International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME) to held in Maldives.

IEEE Mauritius Section in collaboration IEEE UoM SB will be organizing the Smart Farming System Competition.

How Region 8 can be of help to your Section, members, and activities

List any challenges you Section is facing and what support is required from the Region 8. Please, also, give us your suggestions for agenda items that you want to be discussed during the R8 Committee meeting.

Though limited by the COVID-19 pandemic, there have been several webinars delivered along with 2 international conferences held in Hybrid mode. There has been tremendous effort to set these up and nothing would have been achieved without our volunteers