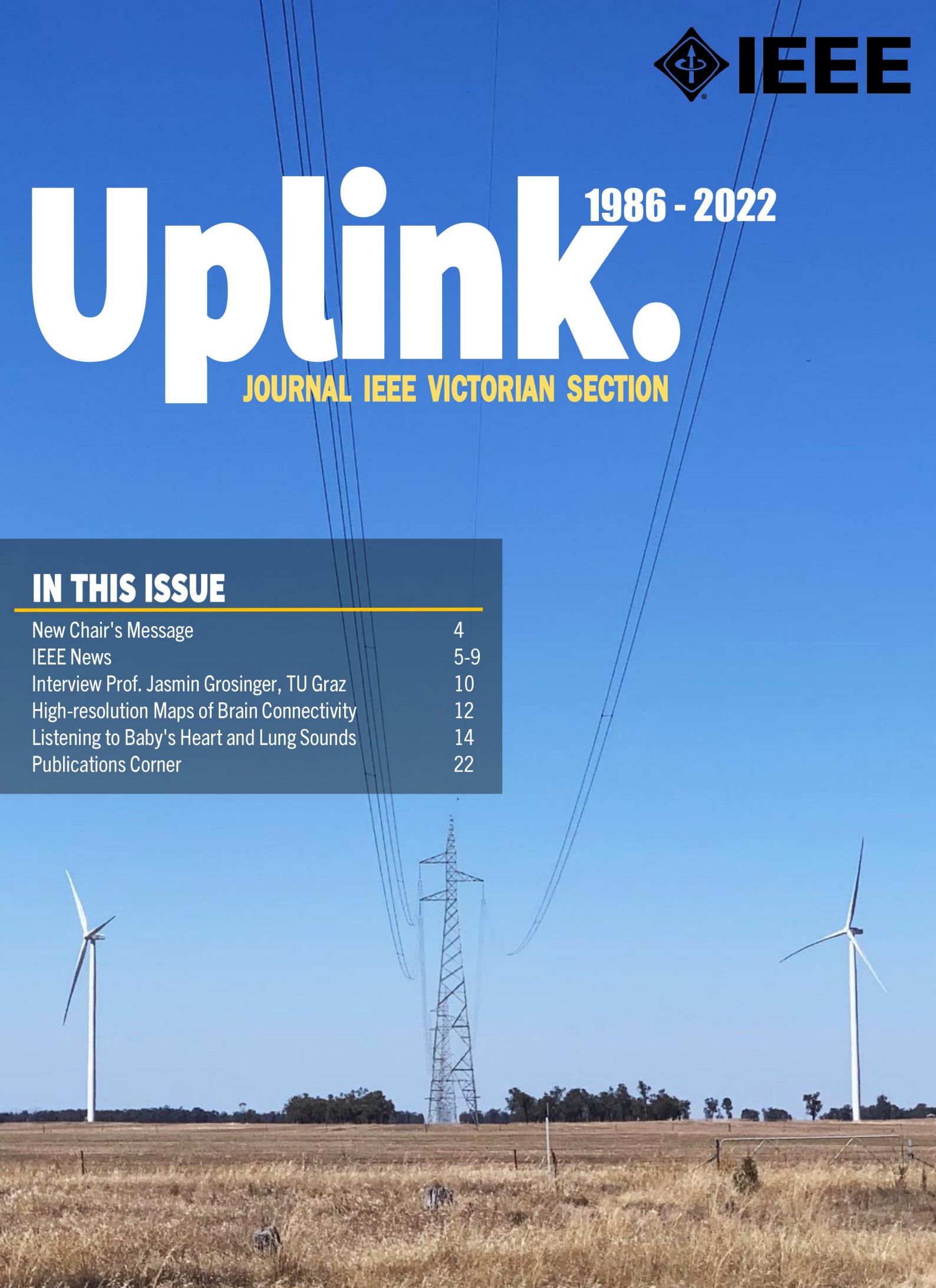
Uplink.

1986 - 2022

JOURNAL IEEE VICTORIAN SECTION

IN THIS ISSUE



ISSN 0817 6744 JUNE 2022

Message for IEEE Victorian Section Members

Dear Members and Friends of IEEE Victorian Section,

Uplink is *your* Journal. This publication exists, not only to inform and enlighten you and other Readers, but also provide a channel of communication for you. If you have any technical topic or matter of interest on which you would like to write an article about, then please do so!

Also, letters to the Editor will be very much appreciated. For example, suggestions on new things you think the Section could do or comments on how we are going would be appreciated. Letters about *Uplink* itself, will be particularly welcome! Priority will be given to letters of 200 words or less. For further details about letter requirements, please refer to the Section website.

We hope to hear from you soon!
The Editors, *Uplink*.

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Our Coverpage

by Inez Zheng

The cover photo is taken near Horsham in Regional Victoria capturing a section of 220kV single circuit transmission line that stretches between Horsham and Red Cliffs. The area is famously known across the global power industry as the 'West Murray Zone' (WMZ) – a region in Victoria that's west of the Murray River, that's shaped into a rhombus by transmission lines. It's also jokingly referred to as the 'rhombus of regret'.

A significant number of Victorian renewable generators are connected to the terminal substations along this line. Shown in the photo as well are two wind turbines from a local wind farm in Horsham on either side of the pylon. The flatness of the region doesn't give the best indication of depth and size through the photo, so to give an indication of scale, the wind turbines have a hub height of roughly 90m and a typical 220kV pylon would be around 50m.

The region is topical due to two underlying characteristics. Firstly, the land is flat and has an abundance of quality wind - ideal for building wind farms. Secondly, there's relatively low transmission capacity and no local synchronous generators - not ideal when there's too many wind farms. This dilemma between resource availability and power system security has made grid connections of renewable projects in Australia a fascinating problem.

High voltage power lines were last built in Australia back in the 1960-70s, where in VIC the main purpose was to transport enough power from the coal-fired power stations in the La Trobe Valley to sparse regional houses so farmers could have lights and watch TV. The same lines are now being used to transport hundreds of megawatts of electricity up to NSW via Buronga or to SA via the Murraylink or back to Melbourne via Ballarat. The limited capacities are a bottleneck in normal operation and the impacts are exacerbated during planned outages. When an outage occurs, inverter based resources (current grid-following renewable technologies) don't have the ability to withstand potential faults and have seen recent <50Hz subsynchronous oscillations suggesting instability.

The early wind farms that were committed like the one shown in the picture (pre-2019), took advantage of the good wind resource without having anticipated the technical challenges that are currently appearing and were easily connected to the grid. The story now is drastically different, where new generation proposing to connect in the WMZ is sitting in a long queue to be stringently assessed for system stability and system strength impacts by the Australian Energy Market Operator (AEMO). Even if the technical assessment deems the connection proposal to meet all performance requirements, old and new projects are financially taking a toll from heavy curtailments due to congestion at either end of the WMZ or system strength issues. Renewable operations under these conditions are a world first and have sparked much interest in IEEE and CIGRE forums for problem solvers: exploring solutions from in-depth innovations to the inverter technology to macro system planning and operating strategies.

See the AEMO map to browse further on wind resources, transmission lines and other data on the WMZ.

220kV Transmission Tower in the WMZ

From the Flightdeck

by Annick Boghossian

Annick Boghassian, Chair 2022-2023

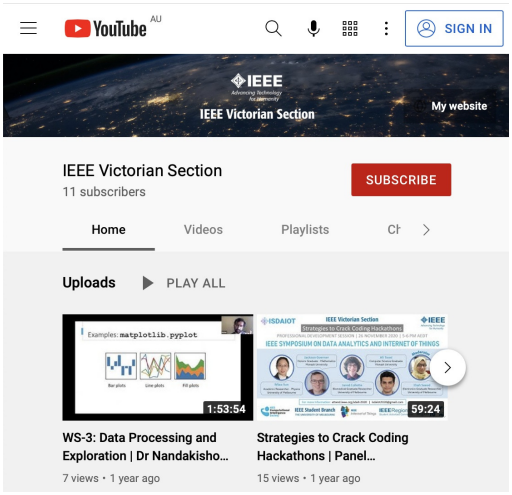
If I learned one thing during the last two years, it is appreciating people's resilience, intellect, their ability of progressing technologies and their utilisation to enable others. It only shows how adaptable, determined, and amazing people are.

As we continue navigating a world during an ongoing global pandemic and coming to terms with the new normal, there have been a lot of positive changes. We have seen students returning to onsite learning at universities and companies continue operating in a hybrid model that see our members working from home and the office.

I know that most of us are very well adapted to working in this setup. Technology and processes have enabled us more than ever during the last two years. During this year we will see more events and talks being held as a hybrid model to enable face to face knowledge exchange and collaboration.

The first hybrid event that I had the pleasure to attend virtually was the 2022 IEEE Region 10 Hybrid Meeting in Hyderabad. The event was over two days on the 26th - 27th of February and it was very well organised for such a large event.

We are very excited seeing the IEEE WIE ILS being held in Victoria for the year of 2022. The event will be hosted and organised by Monash University and we are very proud about having our WIE Affinity Group and the IEEE Victorian Section involved. The organisation is in full flight with a heavy focus around networking and enabling our female engineers to thrive and grow professionally.



IEEE Victorian Section YouTube Channel

There are also challenges ahead such as reviving our dormant chapters and student branches. I hope that with your support we will be able to attract more volunteers this year to enrich our community and share the passion we have as being part of the IEEE.

We encourage you all to follow our chapters who will advertise events and talks via our social media channels in addition to our regular weekly eNotice and our webpage. Also, the section has a youtube channel where we upload recorded talks for later viewing by people who not able to attend in real time.

Lastly, I would like to offer our ongoing technical and organisational support to our chapter groups, affinity groups and student branches.

I would like to hear from you, our reader, in regards to how we can support you better, what we should change, what opportunities are ahead of us and I hope to meet with more and more of you in person throughout the year.

Annick Boghossian
Chair, IEEE Victorian Section
annick.n.boghossian@ieee.org

IEEE News

IEEE Engineering in Medicine and Biology Asia-Pacific International Student Conference

This conference will be held in Melbourne from Monday the 26th of September to Wednesday 28th September. The aim is to showcase the diverse field of biomedical engineering within Victoria, Australia, to high school through to postgraduate students in Victoria and more broadly Australia and internationally, as well as to motivate and inspire the next generation of biomedical engineers. Events will include Keynote speakers, lab tours, workshops, panel discussions and student presentations. Paper submissions are now open. Stay up-to-date by following the Facebook and LinkedIn pages. For further information, you can contact Ethan Grooby from the IEEE EMBS Monash University Student Club or go to the conference website.

IEEE WIE Leadership Summit in Melbourne

The IEEE Women In Engineering International Leadership Summit will be held in Melbourne on the 4th and 5th of August 2022. Monash Engineering is proud to host this event which is supported by the IEEE Region 10 Council and IEEE Victorian Section.

This is a great opportunity to come and meet high profile speakers who have been outstandingly successful in their own fields of endeavour. The speakers are Prof. Cathy Foley, Chief Scientist of Australia, Prof. Chennupati Jagadish, President, Australian Academy of Science, Jane MacMaster Chief Engineer, Engineers Australia, Prof. Bronwyn Fox, CSIRO Chief Scientist, Sally-Ann Williams, CEO, Cicada Innovations, Dr Katie Allen, Member, Parliament of Australia, and Dr Sue Keay, CEO, Queensland AI Hub and Chair of Robotics Australia.

The venue is the wonderful Pavilion building at the Caulfield Campus of Monash University, which has inspirational views across Melbourne and the Bay.

Registration is open on the 1st of June 2022 and Early Bird registration close on 30th June 2022. For further information about this event have a look at the Summit web-site or contact A/Prof. Sudha Mokkapati.

IEEE's Half-Century in *terra australis*

by Tony Gascoigne

THIS YEAR marks 50 years of structured IEEE activity in Australia. The following is a brief digest of the events, initiatives and personalities responsible for our progress from a mere segment of "the rest of the world" (an expression actually used in the early days of the Institute), to the well-regarded "IEEE nation" of today.

Following the historic merger of AIEE and IRE in 1963, membership of the fledgling IEEE was confined largely to North and South America. But with the progressive "regionalising" of the globe - notably the formation of IEEE Region 10 in 1967, we began to see significant membership growth in Australia and other countries in the Asia-Pacific rim.

In 1972, a group of IEEE members led by James J. Vasseleu met in Sydney to prepare a Petition for the formation of an Australian Section. They proposed that the new unit would cover the territory of all Australian States, and also extend into Papua New Guinea. The petition was duly drawn up and signed by 63 local IEEE members. Following approval by IEEE HQ, the pioneering Australia Section was formally established on 16th of August, 1972.

At the first Section meeting, held at Neutral Bay Junction, NSW, on 12 September 1972, James J. Vasseleu was elected Section Chair, Lennox J. Clementson as Section Vice-Chair, and James Deans as Section Secretary/Treasurer. The new Section soon had a diverse program of activities, and there followed a period of successful expansion and membership development, although most activity was confined to the Sydney metropolitan area.

Conscious of their charter to serve all IEEE members in Australia, the Section Committee soon began to explore options for establishing a Sub-Section in Victoria, and in 1975 such a subunit was actually formed in Melbourne. But unfortunately, the new unit failed to perform as expected. There is no known

record of organised technical activity at this time; and even meetings of the sub-section committee (if they ever occurred wwe. Thus, the IEEE Victorian Sub-Section existed in name only, and remained dormant for some years.

In 1981, Brian G. Love, an Advisory Systems Engineer with IBM Australia, returned to Melbourne after working in Sydney for several years. Love had been an active member of the Australia Section Committee and was well aware of the Victorian Sub-Section saga. With the full knowledge and support of the Section Chair, Dr Ramutis Zakarevicius, he set about addressing “The Victorian Problem”.

Love had excellent problem-solving skills, and to say that he was “successful” in the present context would be an understatement. In fact, by late 1981, he had not only created a vibrant new IEEE sub-section, but also set us on course to achieve full Section status, just two years later, in 1983.

It is indeed fortunate that Love was able to accept the mantle of Founding Section Chair, before chronic ill health forced his retirement from work and active volunteering, and ultimately led to his untimely death in 1989, at age fifty.

A detailed account of Brian Love’s work in Victorian Section is best left for another report, and no doubt will receive further attention during the Section’s 40th Anniversary celebrations, in 2023. Suffice to say that we present-day members of the Section are heavily indebted to the man for his dedication, his talents, and his personal integrity.

Concerning other IEEE Sections in Australia, the dates of formation are as follows: Western Australia -May 1984), Queensland (February 1985), South Australia (August 1985), Australian Capital Territory (November 1988) and North Queensland (January 1994) - with a name change in May 2008 to "North Australia Section".

New South Wales Section was formed in 1986. The former Australia Section was wound up in 1987, shortly after formation of the New South Wales Section.

Over the years, there have been many notable contributions by Australian IEEE members to the wider IEEE, whether Regional or Global. Some examples are:-

- Region 10 Director: Jim Vasseleu; Harry Green; Janina Mazierska; Lance Fung (Director-Elect)
- Global Committees: David Burger chaired the IEEE History Committee; Irena Atov was Chair of Women in Engineering.
- IEEE Societies: Greg Adamson was Chair of the Society on Social Implications of Technology.
- IEEE Students: Colin Kline, lecturer at the then Ballarat College of Advanced Education (now Federation University) actively promoted student membership to the newly accredited Engineering Degree streams. In 1986, he became the first IEEE Student Counsellor at BCAE.

No doubt there are many other IEEE members in Australia whose contributions and achievements are worthy of acclaim. But the foregoing snapshot will serve to illustrate the enthusiasm, commitment and professionalism of our past office-bearers, and our volunteer workforce generally.

Formation of a Consultants Network in the Victorian Section

The IEEE Victorian Section Committee at its April meeting approved an investigation as to whether there would be enough interest in the Victorian Section to set up a Consultant's Network. The IEEE has many of these networks in the USA and a few in other Regions.

Such an Affinity Group would aim to facilitate discussion around issues which private practitioners face from a business and practice viewpoint, and provide networking opportunities. The general information about these networks is available at the website. If you would be interested in being a part of such a network in Victoria and Tasmania please drop us a line at Enn Vinnal.

IEEE Region 10 – A View of the future

by Lance Fung, IEEE R10 Director-Elect 2021-2022

UPLINK. Prof Lance Fung from IEEE Western Australian Section has been elected as the next Region 10 Director and UPLINK invited him to set out his thoughts and agenda coming up to his time in office.

First and foremost, I thank the Victorian Section for the invitation and the opportunity for me to share my personal view for IEEE Region 10 in the coming two years. A note from our current IEEE President, Professor Ray Liu, states, “Make IEEE your Professional Home!”

Home, is such a precious word with strong emotional connection for us all. Throughout history and around every corner of the world, people are willing to put in time, efforts, resources, whatever they could, and with whatever they have, to build, improve and defend their homes. I always proclaim when I step into my front door, at the end of every travel, “No place like home!”

Members have demonstrated their identities with IEEE by maintaining their memberships, contributing towards the mission and vision of IEEE, through participation in activities and volunteering in the IEEE communities. During the 2020 election, I have made the following statements:

Given the opportunity to serve as R10 Director, I will dedicate my time, professional experience and practical knowledge to:

- Support innovative projects to develop Local Solutions in alignment with IEEE Mission, Vision and Strategic Plan.
- Actively represent the Voices and Concerns from R10 in IEEE Boards and Committees.
- Develop strategies to improve the Values, Benefits and Experience for R10 memberships.
- Encourage R10 volunteers to participate in decision making, and public recognition of their contributions.
- Establish Collaborative Schemes between students, YP, WIE and High grade members through networking and joint projects.

In 2023-24, I will work with members of the IEEE R10 Executive Committee, to devise strategies, to develop plans and to implement them in order to fulfil my commitments.

A number of these initiatives have already been started or being planned:

- Implementation of a pilot scheme to include an additional Zone Representative from R10 in the coming IEEE MGA Board meetings.
- Continual working towards the realignment of R10, leading towards the aim of establishing TWO region directors in the IEEE Board of Directors and IEEE Assembly, from the Asia-Pacific Region.
- Establishment of a committee, overseeing matters related to ethics and compliance.
- Establishment of a committee to promote trainings and IEEE standards
- Support of innovative and collaborative programs to enhance membership values, benefits and experience.
- Joint meetings with members, R10 Director and Director-Elect for updates, communication and member feedbacks.

2020-2021 have been a challenging period not only for IEEE but for the whole world. However, we have learnt a lot and gained much experience to face the coming years. At the time of writing, IEEE Membership numbers have recovered and reserves have improved. The growth of number of publications is continuing and conference participations have improved with hybrid and virtual modes.

In the next two years, through their dedication, participation and volunteering, I look forward to see Members in the Region proudly proclaim “IEEE is MY professional HOME!”. I hope we share a common view for R10 in the future and let’s work together!

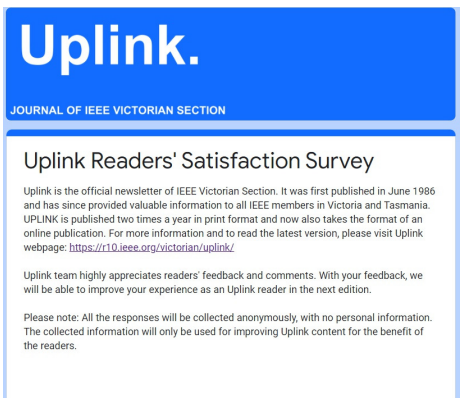
Let’s all work towards the mission and vision of IEEE, advancing technologies for the benefits of humanity.

Biography. *Prof Lance Fung has been a dedicated volunteer in the IEEE for over two decades. He has served in many positions in the executive committees of Technical Society Chapters, WA Section, Australia Council and R10 Ex-Com. He has been a member of the Board of Governors in the IEEE Systems, Man and Cybernetic Society (2010-2015), served as Chair of the IEEE New Initiative Committee (NIC), Conference Quality Committee (CQC), IEEE Technical Program Integrity Committee (TPIC) and previously as IEEE R10 Chair of Educational Activities Committee.*

IEEE UPLINK Survey

The UPLINK editors would like your feedback - out of a fear of being accused of being know-it-alls, we’d like to instead offer you an opportunity to tell us what you would like to see in UPLINK in the future. We have set out questions which gauge your level of satisfaction. Also, you can write about what you would like to see in future editions. You can find the survey at this link.

To acknowledge the contribution of people who completed the survey, the Section Committee at its July meeting will draw two names at random and each winner will be given a $50 voucher for an IEEE eBook from the IEEE USA Shop or from Amazon.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JOURNAL OF IEEE VICTORIAN SECTION

Uplink Readers' Satisfaction Survey

Uplink is the official newsletter of IEEE Victorian Section. It was first published in June 1986 and has since provided valuable information to all IEEE members in Victoria and Tasmania. UPLINK is published two times a year in print format and now also takes the format of an online publication. For more information and to read the latest version, please visit Uplink webpage: https://r10.ieee.org/victorian/uplink/

Uplink team highly appreciates readers' feedback and comments. With your feedback, we will be able to improve your experience as an Uplink reader in the next edition.

Please note: All the responses will be collected anonymously, with no personal information. The collected information will only be used for improving Uplink content for the benefit of the readers.

Student Paper prize winners for first-half 2022

The Victorian Section for many years now has run competitions to highlight the work of Section student members who have papers accepted papers at conferences or for a journal.

The competition is run twice a year so that students who publish earlier or later in the year have equal opportunity. As well, each competition is divided into ‘first-paper’ and ‘non-first paper’ awards so that first-paper authors don’t get crowded out.

To show you the high quality of the papers, last year's second half-year competition winners, Sina Mansour and Ethan Grooby, have written excellent articles for this edition of UPLINK.

In the first half year competition in 2022, there were 11 entries and the winners were announced at the June 2022 meeting of the Section Committee. They were:

First-paper prize winner:

- **Chi Sang Choy:** Virtual Reality Assistant Motor Imagery for Early Post-Stroke Recovery.

Non-first-paper prize winners:

- First: **Ishara Paranawithana et al:** Reducing false discoveries in resting-state functional connectivity using short channel correction: an fNIRS study
- Second: **Ethan Grooby et al:** Real-Time Multi-Level Neonatal Heart and Lung Sound Quality Assessment for Telehealth Applications
- Third: **Jing Zhu et al:** Producing Realistic EV Demand Profiles for Distribution Network Studies.

The judges would like to commend all entrants on the quality of their papers. We hope to have popular versions of two of these papers in the next edition of UPLINK.

The Paper Prize Committee is undertaking a review of this competition and its rules before launching it again in the second half of the year. If IEEE members hve any thoughts about how the competition could be improved then send us an email with your thoughts.

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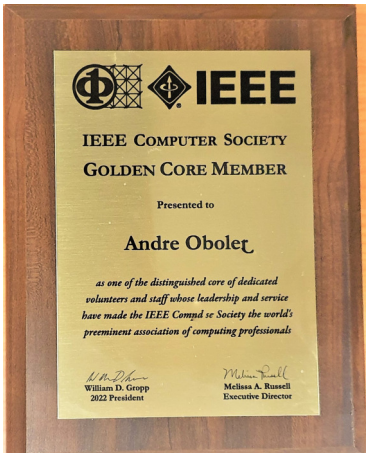
Golden Core

by Andre Oboler

The IEEE Computer Society has named Victorian Section member Dr Andre Oboler to its Golden Core.

The award is the society's highest volunteering award and its members form a permanent roster of the principal contributors to the society's success. A small number of new members are added to the Golden Core each year and receive a plaque, lapel pin, and letter to mark the occasion.

Dr Oboler is currently serving his second term as the society's Vice President for Member and Geographic Activities and began his volunteering with IEEE as Vice Chair and then Chair of the Victorian Section's Computer Society Chapter. Commenting on the award he said receiving it was an unexpected honour, but marked successes across a range of different leadership roles in the society, each of which was made possible through the support of many dedicated volunteers and staff.



IEEE Vic. Section Elected Officials 2022-23

Annick Boghossian is the Chair at Victorian Section. She is a Software Engineer Specialist at Telstra. She has served as the Chair of Computer Society Chapter Victorian Section.

Vijay S Paul is the Vice Chair at Victorian Section. A communications professional, blogger, and business speaker, he is working as Senior Communications Coordinator with Monash Data Futures Institute at Monash University.

Akhlaqur Rahman (AK), SMIEEE is the Secretary at Victorian Section. He is a Lecturer at Engineering Institute of Technology. He is also serving as the Secretary of IEEE Young Professionals Society (Victoria), and Secretary of IEEE ComSoc Society.

Susmita Saha is the Assistant Secretary at Victorian Section. She is a Research Fellow at Monash University working in the field of Computer Vision for medical research.

Priya Rani is the Treasurer at Victorian Section. She is an Associate Research Fellow at Deakin University. She is also a STEM Ambassador with Science and Technology Australia, promoting STEM across Australia.

Champake Mendis is the Assistant Treasurer at Victorian Section. He is a Chief Data Scientist at Triple A Super. He also served as Assistant Secretary at Victorian Section 2020-21.

ISSN 08176744 June 2022

Interview: Prof. Jasmin Grosinger, TU Graz, Austria

by May Alhajri

Uplink: Recently the Australian Microwave Theory and Techniques Chapters hosted a Distinguished Lecture by Professor Jasmin Grosinger from Graz University of Technology at the Inffeldgasse campus, Austria. Prof. Grosinger is well known in the MTT Society and is a member of Women in Microwaves. As a follow-up, we interviewed her for UPLINK.

Uplink: A lot of interesting people have studied or worked at your various alma maters: Christian Doppler at TU Wien and Nicola Tesla at TU Graz for example. Just out of curiosity, was technical history taught at either of these institutions?

Prof. Grosinger: I am aware of a history lecture by one of my colleagues at Graz University of Technology (TU Graz), who teaches an elective course in wireless communication history. I am not aware of such a course at my former alma mater, Vienna University of Technology. I am a fan of Nicola Tesla and his vision of ubiquitous wireless power transfer. I am working in both areas of wireless power transfer: near field and far-field wireless power transfer. My research focuses, however, on low power levels and simultaneous communication.

Uplink: Tell me a bit about how microwaves are taught at TU Graz. Are there particular ways of doing this?

Prof. Grosinger: At TU Graz, we teach microwaves in the BSc curriculum, offering lectures and practicals on radio frequency and microwave engineering fundamentals. We revisit the mathematical foundations and then focus on transmission line theory, the Smith chart, scattering parameters, impedance matching, passive components, and gain and stability. In the MSc curricula, the students can sign up for an advanced microwave course, in which we focus on waveguides and other microwave components, such as oscillators, couplers, and more. We also offer an antenna and wave propagation course.

Uplink: Are there many higher degree candidates studying microwave, electromagnetics, or radio technology at Graz?

Prof. Grosinger: Unfortunately, not many students are enrolling in our courses. Up to 150 students sign up for the introductory course, as it is mandatory. Only a few of the students then show some interest in microwave engineering. In general, we have fewer students enrolled in electrical engineering. The faculty is now focusing on public relations activities to attract students to enroll in electrical engineering.

Uplink: Is there a good co-operation/sponsorship between industry and TU Graz (e.g., funding, projects, and employment opportunities)? We imagine that the European microwave scene would be quite vibrant and therefore well supported, given the many space, air, defence, transport, and cellular industries.

Prof. Grosinger: We are very fortunate to have a lot of industries around here in Graz, particularly the semiconductor industry, such as NXP Semiconductor and Infineon Technologies. I cooperate with them on research projects and most of my Ph.D. students who graduated from my group now have jobs at NXP or Infineon. Also, BSc and MSc students benefit from the close-by industry and already start to work for these companies as students.

Uplink: What is the gender balance for students and faculty at TU Graz? Is it something that involves or needs proactive policy, or is it evolving well enough naturally?

Prof. Grosinger: In electrical engineering, we have about 10% female students. In the faculty, it is even less. However, the university is investing quite some money to provide courses for faculty members to gain competencies in gender and diversity in teaching and

Figure 1: *Graz University of Technology (Inffeldgasse campus), Graz, Austria*

research. I participated in these courses and benefited a lot. From my point of view, every permanent faculty member should attend this course, becoming aware of, for example, gender, similarity, and publication biases.

Uplink: I do personally believe that science and engineering are for everyone, regardless of gender. This is proven by the number of accomplished women around the world. So, I am really interested to know what drew you to science and engineering, both as an academic pursuit and as a profession?

Prof. Grosinger: I studied electrical engineering because of a visit to the university when I was in high school. I was fascinated by a laser experiment that one of my former peers at the Vienna University of Technology presented to the high school students. Also, as a teenager, I read the book Contact by Carl Sagan. The main character was a female engineer who studied electrical engineering. I then researched free-space optics systems exploiting polarization modulation for my MSc thesis.

Uplink: I have sometimes come across surprising ways of doing things. One recent one was on tightening bolts (http://www.smartbolts.com/ and https://strainlabs.com/about-us/). When I saw your bend transducer, it reminded me of that surprise factor. Tell us how you came up with that idea.

Prof. Grosinger: The bend transducer was joint work I did with Joshua Griffin when I was an intern at Disney Research in Pittsburgh. Josh attended the IEEE RFID conference and was fascinated by an antenna transducer presented in one session. We revisited the proposed idea and came up with a more power-efficient chip transducer for sense bending. The application we were targeting was queue line games for Disney Parks. It was a fun project, and I still work in the field of RFID sensor tags to realize dependable batteryless wireless sensors.

Uplink: What do you think is the most important character trait in a successful scientist/engineer?

Prof. Grosinger: I recently discussed this topic with my colleagues, and we could not straightforwardly answer this question. However, it is a good thing if you are a person who aims for knowledge gain; this helps you to hold up when facing difficulties and move forward.

Uplink: As there may be women who sometimes experience self-doubts during their careers, what do you think would be the best way for women in science and engineering to cope with self-doubt and imposter syndrome?

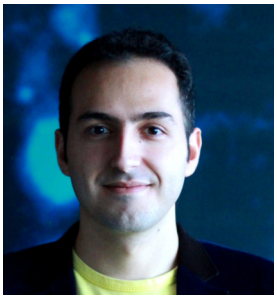
Prof. Grosinger: It is necessary to revisit our behavior when raising our children. When we raise our children, we stick to the concept of what is appropriate behavior for men and what is appropriate for women. Rational, logical thinking is something we affiliate with men rather than women. In gender science, researchers speak about doing gender or undoing gender: Revisiting this concept in my Women in Microwaves (WiM) activities, I focus on undoing gender events, spotlighting female scientists/engineers and their competencies.

Uplink: Finally, WIM is both in WIE and the MGA.How can people get involved with WIM?

Prof. Grosinger: Please get in touch with me, Sherry Hess, or Wenquan Che to get involved. We are co-chairing the MTT-S MGA WiM subcommittee. The committee organizes various events to promote Women in Microwaves. Please check out our website for more details.

A Closer Look: High-resolution Maps of Brain Connectivity

by Sina Mansour L.



Uplink. Sina Mansour L. is currently doing PhD at the University of Melbourne on computational models of brain connectivity. His paper won a prize in the 'Student paper publication' competition in the second half year 2021 and Sina has turned it into a popular article for Uplink.

Introduction. The human brain consists of a complex network of neuronal connections linking different brain regions together [1]. These connections are unique to every individual and are believed to encode their thoughts, beliefs, and behaviours [2]. Decoding how the wiring patterns in the human brain vary between individuals and how it relates to our cognitive abilities can thus uncover immensely valuable knowledge about the human brain and behaviour. That is why we are interested in studying and modelling this complex map of brain connections [3]. To do this, computational models are used to extract information from brain MRI scans and map a brain network that is called a connectome (illustrated in Fig. 1).

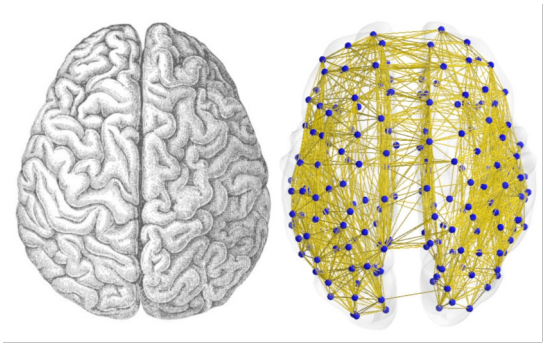


Figure 1: *A connectome (right) is a network map of the human brain (left). The connectome models the wiring of nerve fibres between different brain regions. The connectome consists of nodes (blue spheres), indicating different brain regions, and edges (yellow connections) explaining the connectivity map between nodes.*

Connectome fingerprinting. Studies have previously shown the immense capabilities of this network model. For instance, connectomes mapped from individual brain scans can identify unique patterns of neural connectivity for that individual. These patterns can then be used to accurately identify an individual and differentiate them [4]. This is much like a fingerprint scan; just as the ridges and valleys in a fingerprint carry enough information to uniquely identify someone, so does their map of brain connections. This concept is formally known as neural fingerprinting.

Predicting human behaviour. Research also looks at harnessing the unique information in a connectome to discover more about the underlying mechanisms driving brain functions [4][5]. The fact that connectome models are unique in every individual is interesting in itself, but we are also searching for a better understanding of how wirings in the brain may give rise to individually unique behavioural characteristics. To that end, we could take advantage of recent advancements in machine learning and teach a computer to predict an individual's behavioural characteristics - such as their personality, or cognitive abilities - from the information stored in their connectome [6]. Needless to say, predicting an individual's behaviour is significantly more complicated than identifying that individual. Connectome models used to predict individual behaviours so far have suboptimal accuracy and are far from perfect. Motivating a continued search for better methods and models.

High-resolution connectomes. Our research team at the University of Melbourne is investigating different approaches to map a more accurate model to enhance neural fingerprinting and behaviour prediction performance. We have mapped different models, capturing the anatomical connectivity structure and functional activity patterns of 1000 individual brain scans, from the Human Connectome Project. We anticipated that the spatial resolution of a model could largely impact the performance of the predictions made. Hence, we proposed a novel high-resolution connectome mapping method that redefined the traditional way a connectome was mapped. In our research, published in *NeuroImage*, we explore some benefits of this novel approach [7].

Traditionally, a brain atlas is first used to divide the brain into separate regions that have distinct functions and structures (an exemplary brain atlas is presented in Fig. 2). Then every region is treated as a separate entity and a network is mapped to describe the relationship between these regions. For instance, a structural connectome describes whether different brain regions are anatomically connected by nerve fibre wirings. The use of brain atlases in mapping connectomes provides a simplified model that has proven beneficial in understanding the nature of brain connectivity. Nevertheless, this simplification comes at the price of masking nuances in the nature of the connectivity.

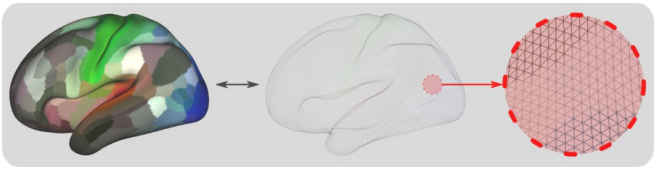


Figure 2: *A brain atlas (left) divides the brain into separate regions that are used to map traditional connectomes. Alternatively, our high-resolution method uses infinitesimal points extracted from a detailed surface mesh (right) to map a connectome.*

In our method, a high-resolution surface mesh is used to define infinitesimal brain regions spanning the surface of the cerebral cortex that are only a few millimetres apart. This high-resolution representation was engineered to maximise the amount of detail from imaging data that could be captured by the connectome. This method increases the number of regions mapped from approximately 100 regions traditionally used to nearly 100,000. We anticipated this increase in resolution could better model intricate individual differences in neural connectivity.

Connectome uniqueness in high-resolution. It turns out that there's a world of information that is neglected when creating a simplified atlas-resolution connectome. We found that higher resolution brain connectivity maps contain enough information to accurately identify every single person in the human population. We next focused on regions that contained significantly higher individually unique connection patterns and the results were intriguing (see Fig. 3). We observed that brain regions expressing a higher degree of uniqueness mainly resided in the higher-order association cortices. These regions are known to be involved in various cognitive functions, language processing, and personality. On the other hand, somatomotor and visual sensory regions were relatively less unique in individuals. In a sense, this is in line with our understanding that every human is unique in their personality and cognitive characteristics.

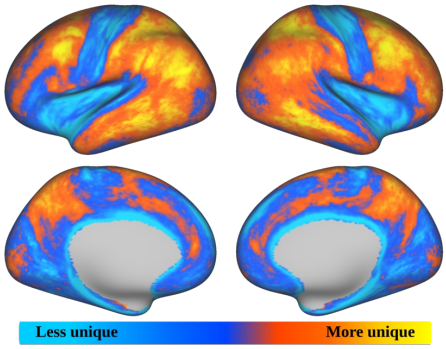


Figure 3: *A high-resolution map of connectome uniqueness. Warmer colours indicate regions that show more uniqueness between individuals. These regions have a key role in distinguishing between connectomes of different people and are better fingerprints.*

We also found that the high-resolution connectome mapping method can improve the accuracy of behaviour prediction tasks. This essentially shows that the extra level of detail captured in a high-resolution connectome is behaviorally and cognitively relevant. The high-resolution maps were able to improve predictions of an individual's intelligence, cognitive performance, personality, and other behavioural habits such as smoking.

There's more to explore. A brain connectivity map holds interesting knowledge about how human cognition, behaviour and mental health emerge from our individually unique neural connectivity patterns. The key to unlocking this knowledge and decoding the secrets of the human brain is in the development of future methods that could appropriately harness the complex information hidden in the human connectome. Utilisation of high-resolution models such as the one we proposed, together with the development of technologies to interpret and visualise these connectomes will take us one step closer to deciphering the mysteries of the human brain.

Listening to Baby's Heart and Lung Sounds

by Ethan Grooby

Uplink. Ethan Grooby is currently doing joint PhD at Monash University and the University of British Columbia on audio and video analysis of newborns to determine their cardio-respiratory health. This paper won a prize in the 'non-first student paper publication' competition in the second half year 2021 and Ethan has turned it into a popular article for Uplink.

Introduction. The first month of life is when a baby is most vulnerable, especially if the baby is born preterm. More than 10% of babies are born prematurely, are consequently at higher risk of infections, and require respiratory support or treatment due to their under-developed lungs [1]. Monitoring a newborn's heart and lung health is crucial for the early diagnosis of cardio-respiratory conditions. This monitoring ensures that clinicians can provide timely and appropriate care to prevent chronic illness or death.

A stethoscope is a well-known medical device, strongly associated with the medical profession. Stethoscopes allow clinicians to listen to a newborn's heart or lung sounds, providing information about their health status. However, hearing clear and diagnostic quality heart and lung sounds is hampered due to internal and external noise in the hospital environment. The reason is that the chest sounds are a mixture of the desired heart and lung sounds, along with crying noises from the baby, the background environment, and the movement of the stethoscope and baby. If a newborn is on respiratory support, monitoring respiratory health is essential. However, medical equipment noise prevents lung sounds from being heard.

Digital stethoscopes are similar to traditional stethoscopes but have the added ability to record chest sounds along with other physiological signals. These added abilities offer the opportunity for software-based signal processing and machine learning, enabling clean heart and lung sounds to be obtained for both clinical and automated decision making of a newborn's health. Furthermore, digital stethoscopes offer increased accessibility of newborn health monitoring. Through automated feedback systems and signal processing, a wider range of individuals can collect diagnostic quality heart and lung sounds in both home and hospital environments. Then via telehealth, the health information can be provided to clinicians.

My research focuses on software analysis of digital stethoscope acquired chest sounds to provide clear heart and lung sounds for newborn health monitoring. In the following sections, I will highlight some designs of digital stethoscopes, and then present my work on software analysis for clear sounds and automated health assessment.

Existing Digital Stethoscopes and Future Directions. Some examples of currently available digital stethoscopes include:

- **Clinicloud:** Incorporates a microphone that can record chest sounds on a mobile phone [2].
- **Littman:** Includes two microphones. One microphone records chest sounds, and the other records environmental noise. This setup enables noise cancellation, similar to existing headphones [3].
- **HD medical:** Incorporates electrocardiogram (ECG) monitoring on the head of the stethoscope. This setup provides a synchronous recording of chest sounds and ECG. With these synchronous recordings, the heart sound signal can be extracted. The extraction process utilises the relationship between ECG QRS peaks and heart sound peaks. The start and end times of the heartbeats are then identified and separated from the recording [4].

Some limitations of existing digital stethoscopes include the inability to remove stethoscope movement noise, as well as the separation of heart, lung, and respiratory support sounds. Through the integration of a movement sensor within the digital stethoscope, it is possible to detect and remove baby and stethoscope movement noises. Additionally, having two microphones placed in different locations of the chest would enable sound separation because, at each location, the composition of heart, lung, and noise sounds differ. For instance, if the microphone is placed over the heart, then heart sounds are predominant.

Whereas, if the microphone is placed on the lower right chest, lung sounds are predominant. These varying levels of heart, lung and noise sounds can be inputted into an algorithm. The algorithm then identifies and separates these sound components based on how the volume changes at different locations.

Software: Obtaining Clean Heart and Lung Sounds. Using a digital stethoscope, chest sounds containing a mixture of heart, lung, noise sounds is obtained. Through signal processing and machine learning, a two-step process to provide clean heart and lung sounds is used. The first step indicates the signal quality of the heart and lung sounds. The second step employs a denoising and sound separation algorithm that removes noise and separates the recording into high-quality heart and lung sounds.

For the first step, a continuous 5-level scale was used to indicate heart and lung signal quality (Figure 1). A signal quality of 5 refers to clear heart and lung sounds, whereas a signal quality of 1 refers mostly to noise present in the recording. Signal quality of 3 refers to borderline acceptable heart or lung sounds quality. The purpose of providing a signal quality measure is threefold:

- Prompt the user to retake chest sound recordings if the signal quality is too low (signal quality score of less than 3), enabling a wide range of users to obtain recordings. These recordings can then be sent to a clinician for analysis.
- Identify segments of the chest sound recording that are not of diagnostic quality and are removed before analysis.
- Assist in optimal placement of the digital stethoscope.

Signal quality assessment was calculated using two different methods: handcrafted features and deep learning. For the deep learning approach, given the small dataset, transfer learning was applied. For transfer learning, a relevant pre-trained model called YAMNet was used. YAMNet was trained on millions of YouTube videos to classify audio into one of 521 classes. These classes included heart sounds and murmurs, respiratory sounds, wheezing, and relevant noise sources, overall making them suitable for transfer learning. YAMNet's last few layers were replaced with a regression output layer that provided the signal quality of heart and lung sounds. These final layers of YAMNet were then retrained for signal quality assessment.

For the handcrafted features method, the following features were extracted:

- **Time domain**: statistical features based on the distribution of values in the recordings and autocorrelation
- **Frequency domain:** features based on the power spectrum of the recording in particular frequency bands related to heart, lung, and noise sounds
- **Time frequency domain:** features based on the short-time Fourier transform and Mel-frequency cepstral coefficients representation of the recording
- **Heart sound segmentation:** features based on separating the recording into heart cycles
- **Lung sound segmentation:** features based on separating the recording into inspiration and expiration.
- These features were then used to train a regression classifier to estimate heart and lung signal quality.

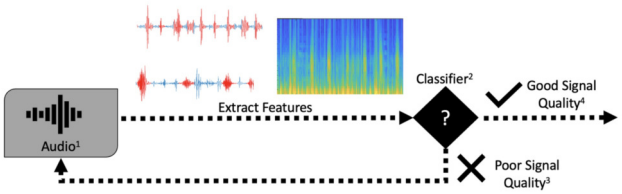


Figure 1: *Software Processing: Step 1 Signal Quality Assessment. 1. Audio is obtained from digital stethoscope recording of the baby. 2. Extracted features are inputted into signal quality classifier that outputs score of 1-5 for heart and lung signal quality. 3. If signal quality is poor (score less than 3), audio needs to be retaken. 4. If signal is good, can proceed to further analysis of the chest sounds.*

Once poor-quality chest sound recordings were removed in the first step, the next step was to implement denoising and sound separation to obtain clean heart and lung sounds (Figure 2). This separation was achieved using non-negative matrix

co-factorisation (NCMF). The idea behind NMCF was to separate the time-frequency representation of the recording into two matrices: a basis matrix and a temporal activation matrix. Each column of the basis matrix represented the spectral composition of a component of the chest sound. For example, the heart sound spectral composition had a 50-250 Hz frequency band, and the lung sound spectral composition had a 200-1000 Hz frequency band. Each row of the temporal activation matrix represented the time when a particular component of the chest sound was present. For example, for heart sounds, the values were one when a heartbeat occurred and zero when there was no heartbeat.

A reference database was used to calculate the basis matrix. The database contained 10 examples of clean heart and lung sounds and pure noise (e.g., crying, respiratory support, and stethoscope movement). With this reference database, the chest sound recording was separated into four components: heart, lung, noise, and unsupervised sounds. The unsupervised sound components were chest sound components that did not sufficiently match any reference database spectral patterns. These sounds were presumed to be from an unknown noise source.

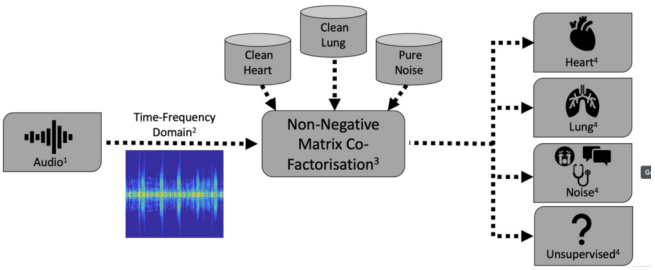


Figure 2: *Software Processing: Step 2 Denoising and Sound Separation using Non-negative Matrix Co-Factorisation (NMCF). 1. Audio is obtained from Step 1 Signal Quality Assessment (Figure 1). 2. Audio is converted from the time-domain to the time-frequency domain. 3. NMCF method is implemented with input of audio needing to be denoised and separated, as well as the reference heart, lung, and noise sounds. 4. Output of NMCF method into separated heart, lung, noise, and unsupervised sounds.*

Health Monitoring Applications.

The presented hardware and software solutions enabled clean heart and lung sounds to be obtained. With this, clinicians can make more accurate diagnostic decisions and have the opportunity for automated health monitoring.

In my work, I explored four health monitoring applications. The first application was the extraction of vital signs from chest sound recordings. With clean chest sounds, both heart and breathing rates were calculated. These vitals could assist in both clinical decision making and as input into other models.

The second application was respiratory distress prediction. Respiratory distress refers to when babies experience increased breathing work, i.e., breathing harder and faster. For this application, recordings were taken within the first minute post-delivery from the chest and back of the newborn. Newborns were then monitored to see if respiratory distress developed later. The random undersampling boosting classifier was used to deal with the data imbalance. Overall, both heart and lung sound information were important for predicting respiratory distress.

The third application investigated the effects of surfactant therapy, a treatment given to preterm babies experiencing respiratory distress syndrome. Heart sounds in the 0-400 Hz band and lung sounds in the 200-600 Hz band significantly changed post-treatment.

The final application was cardiac murmur detection from heart sounds, and it is still under investigation. Cardiac murmurs refer to abnormal heart sounds that can indicate an illness. A combination of deep learning and heart sound segmentation methods are being tested.

Conclusion.

Chest sound recordings provide invaluable information about a newborn's heart and lung health necessary of adequate care. However, an appropriate hardware design of a digital stethoscope and software implementation is required to obtain clean heart and lung sounds.

Once obtained, numerous opportunities are possible, such as respiratory distress prediction and cardiac murmur detection.

Key benefits of digital stethoscopes over traditional technology are the accessible nature of the device, making it feasible for both home and hospital usage by a wide range of users, as well as the ability to capture the health information on a phone and send it via telehealth to clinicians.

Chapter Corner - Engineering and Medicine and Biology Chapter

by Paul Junor

Paul Junor is the Chair of EMBS Victorian Chapter. He was a Senior Lecturer in Electronics and Biomedical Engineering at La Trobe University, has been a sessional lecturer at the University of Melbourne, Monash, RMIT and is now with Swinburne University.

Dr Emerson Keenan is the Vice-Chair of EMBS Victorian Chapter. He is a Research Fellow working between the Department of Electrical and Electronic Engineering and the Department of Obstetrics and Gynaecology at The University of Melbourne.

Dr Vijay Venkatraman is the Secretary of EMBS Victorian Chapter. He is a Senior Researcher at The University of Melbourne and works in the field of medical image analysis.

The Victorian Chapter of the IEEE Engineering in Medicine & Biology Society currently has a membership of approximately 75 academics, practitioners, and students. In 2022, we plan to continue our suite of online presentations bridging technology for solutions to medical problems and biological questions. We also highlight the exceptional capabilities and ingenuity of the local world-class biomedical community, that punches well above its weight on the international stage.

This online series, usually in the evening of the third Tuesday of each month, features experts in the clinical and research arena. Its intention is to strengthen the nexus between engineering and medicine in our very rich local research environment, and to encourage the development and commercialization culture.

Our first technical meeting for 2022 (February 15th), Clinical Engineers Speak: Keeping Hospitals Working in a Pandemic featured a lively forum discussion from the biomedical engineering departmental managers of a number of tertiary hospitals in Victoria. They came together to share their experiences of the challenges in managing the critical frontline equipment in healthcare facing the Covid-19 pandemic. Moderated by Dr Robert Barnett (Alfred Hospital), the panel comprised Andrew Moorhouse (Austin Health), Dr Rebecca Bailey (Royal Melbourne Hospital), Lejo Thomas (Albury Wodonga Health), Saman Mudaliar (Goulburn Valley Health), Shoo Chin Siah (Royal Women's Hospital), Dung Dang (Western General Hospital), Prem Krishnan (Peter MacCallum Cancer Centre), Frank Meacco (Monash Medical Centre), Leigh Baker (St Vincent's Hospital), along with Gordon Szegi (Health Purchasing Victoria).

Professor Peter Lee of the University of Melbourne provided this year's second meeting (March 15th), Safer Personalized Medical Devices, complementing and extending the presentation in February last year by Associate Professor David Ackland and Dr. Elyse Passmore. His presentation describes development of point-of-care 3D printing for orthopaedic implants such as in mandibular restorations and pelvic section replacements, and the characteristics of the necessary materials used, shown in the dynamics of gait analysis applications.

On our April 19th meeting, Repetitive Transcranial Magnetic Stimulation in Patient Care was delivered by Professor Paul Fitzgerald, Director of Epworth Centre for Innovation in Mental Health, and Monash University Department of Psychiatry. The talk described how the technique has evolved over twenty-five years, primarily as a personalized therapy for treatment-resistant depression, and also applied to Alzheimer's Disease and Huntington's Disease. Practical aspects of the instrumentation were discussed along with the history of adoption, efficacy of treatment protocols, regulation, and expected future applications.

Further meetings planned for this year will include more topics in technical issues of medical equipment, and biomedical start-ups.

Student Branch Corner- Deakin University's IEEE Student Branch is Reborn

by Deakin Student Branch

For the last few years, the IEEE Student Branch at Deakin University has laid low without much active engagement. But the good news is, all that is about to change! This year we have a new committee that is devoted to reviving the Student Branch and engaging with the student community, particularly at the undergraduate level, which shas remained disconnected in the past. We have an event-packed year with talks from academics and industry specialists, professional skills workshops, hackathons, debates and networking opportunities. To find out what is on for the month, please check out our Facebook and Instagram pages.

Now, let us introduce the new committee members

Mohammed Al-Gumaei is the Student Branch Chair. He received his Bachelor of Electronic Engineering with honours from Universiti Teknikal Malaysia Melaka (UTeM)-Malaysia in 2016. He also obtained his Master of Science in Electronic Engineering (MSc) from the same university in 2018. Currently, Mohammed is a PhD student at the Institute for Intelligent Systems Research and Innovation (IISRI) at Deakin University. His key research area is human performance assessment using physiological signals.

Arian Shajari is the Student Branch Vice Chair. He received his bachelor and master degrees in Mechanical Engineering with Honours from RMIT University in 2018 and 2019 respectively. Currently, Arian is a PhD student at the IISRI at Deakin. His research field is in the utilisation of AI-based methods for detecting certain human behaviours by their driving performance and physiological signals.

Rehan Mohammed is the Student Branch Event Organizer and a PhD student at IISRI at Deakin. He holds a Bachelor of Electronics and Communication Engineering from JNTUH College of Engineering and Master of Electronics Engineering and Engineering Management from Deakin University. He is very passionate about intelligent data fusion and analytics frameworks,machine learning techniques and turning information into insights. Rehan's current research area focuses on prognostic approaches for remaining useful life prediction of Lithium-ion batteries.

Ms Nicole Toomey is the Student Branch Public Relations Officer. Commencing her PhD in January 2021 at IISRI, Ms Toomey has completed her Bachelor of Psychological Science (BPsychSc) and her Advanced Graduate Diploma of Psychology (GradDip - Advanced) at Deakin University in 2019 and 2020 respectively. She is passionate about social statistical analyses and bridging the gap between subjective and objective measurement in the multidisciplinary field of Engineering Psychology, otherwise known as Human Factors Engineering. Yearning to make a difference, Nicole is currently focused primarily on exploring the objective measurement of trust in human-robot interaction (HRI).

Camilo Gonzalez is the Student Branch Secretary. He is a PhD student at IISRI at Deakin and works on the development of new motion cueing algorithms for motion simulators. For his undergraduate degree, Camilo studied Aeronautical and Aerospace Engineering at University of Leeds where

he also later completed a master's by research in the field of aerial robotics. In his free time, Camilo enjoys flying drones, outdoor activities, going to the gym and working on miscellaneous robotic projects and gadgets.

Mohammed Al-Ashmori is the Student Branch Treasurer. He received a Bachelor of Engineering degree in Mechatronics from the International Islamic University Malaysia, in 2013, and a master's degree in Automatic Control and Mechatronics Engineering from University of Technology Malaysia, in 2017. He is currently pursuing his PhD at IISRI at Deakin. His current research interests include model predictive control, motion cueing algorithm, and robotics.

Events of 2022

To kick off the event calendar, the Deakin Student Branch held a sausage sizzle on 1 April 2022 at the university's Waurn Ponds Campus. This was a welcome party event, and the main goals were to promote the presence of IEEE Student Branch, increase the number of student members and to build a community that will participate in future events. The two-hour event had a good turn-out with 30 ticket holdersand several by-passers who decided to join the event and learn about IEEE.

The attendees learning about IEEE

Our event schedule for the rest of the year is as follows:

- May: Women in engineering career talk in panel discussion format.
- June: Science communication and elevator pitch workshop.
- July: Hackaton – put your technical skills to use in a fun and friendly competition environment.
- August: Three-minute presentations from students who have had IEEE papers accepted. Winner will move on to compete with chapters in other universities.
- September: Talk from IEEE speaker on writing papers and research proposals with tips for increasing chances of acceptance.
- October: Inter university trivia competition.
- November: Networking event with industry experts and academics.
- December: New committee elections.

Thank you for everyone who turned up for the first event and had a great time. We hope to see you more in the year!

If you want to follow up on who we are and what we will be doing, youcan find more or contact us at: Facebook | Instagram | Email

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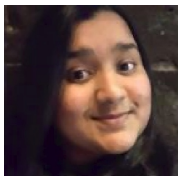
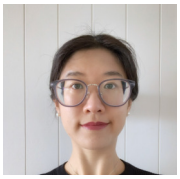
Industry Co-ordinator Sattar Seifollahi 	Conference-Coordinator Greg Adamson 	Awards and Recognition Committee Chair 	Section Student Rep. Honey Sabu 
Student Activities Chair Simona Karevska 	Uplink Editor May Alhajri 	Uplink Editor Inez Zheng 	Uplink Editor Enn Vinnal 
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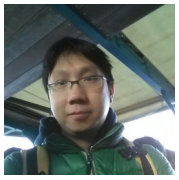
Industrial Applications Md Shihanur Rahman 	Information Theory Terrance Chan 	Nanotechnology Chapter Chair	Oceanic Chapter Chair
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Publications Corner

Here, for your interest, are some of the theses/ publications by IEEE Victorian Section members.

• ***Publication:*** Challenges in Power System Strength Assessment with Inverter-Based Resources
Name: Lakna Liyanarachchi
Field of Study: PhD(Electrical and Electronics Engineering)
Affiliation: Deakin University

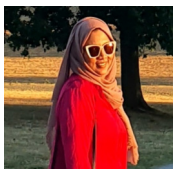
• ***Publication:*** Factoring Variants of Chebyshev Polynomials of the First and Second Kinds with Minimal Polynomials of cos(2 π / d)
Name: David Wolfram
Field of Study: Computer Science
Affiliation: Visitor (Australian National University)

• ***Publication:*** A Novel Optical Assay System for Bilirubin Concentration Measurement in Whole Blood
Name: Jean Pierre Ndabakuranye
Field of Study: PhD (Electrical and Biomedical Engineering)
Affiliation: The University of Melbourne

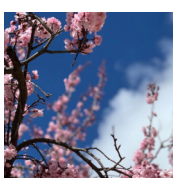
• ***Publication:*** mm-Wave Chipless RFID Decoding: Introducing Image-based Deep Learning Techniques
Name: Larry Arjomandi
Field of Study: PhD (Electronics and Computer Sciences)
Affiliation: Monash University

• ***Publication:*** Real-Time Multi-Level Neonatal Heart and Lung Sound Quality Assessment for Telehealth Applications
Name: Ethan Grooby
Field of Study: PhD (Biomedical Engineering)
Affiliation: Monash University

• ***Publication:*** Connectome spatial smoothing (CSS): Concepts, methods, and evaluation
Name: Sina Mansour L.
Field of Study: PhD (Biomedical Engineering)
Affiliation: University of Michigan-Ann Arbor



• ***Publication:*** Risk and Compliance in IoT-Health Data Propagation: A Security-Aware Provenance based Approach
Name: Fariha Tasmin Jaigirdar
Field of Study: Post-doctoral Researcher (Cybersecurity)
Affiliation: Monash University



• ***Publication:*** A Blockchain-Based Consent Mechanism for Access to Fitness Data in the Healthcare Context
Name: May Alhajri
Field of Study: PhD (Cybersecurity)
Affiliation: Monash University

Editors' Page

Reminder to do our survey

As noted in the IEEE News Section, we would be pleased to hear from you. If you would like to do the survey and provide us with feedback on how well you liked this edition of Uplink, please visit this link.

Editors for the next edition of UPLINK

Each edition of Uplink has its own set of editors. People can learn how articles are sourced, edited and transferred into the Scribus publishing tool. If you enjoy team work and working collaboratively, Uplink would be an ideal environment for you. Please contact: May Alhajri.

Editors for this edition

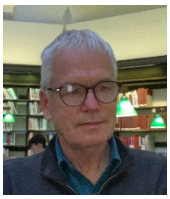
May Alhajri

May is a Cybersecurity PhD student and Teaching Associate at Monash University. She also worked as Teaching Associate at KFU, Saudi Arabia. She previously worked as an Industrial IoT Systems Engineer at TAQNIA. May holds a M.Sc. degree in Cybersecurity from Monash University and a B.Sc. degree (Hons.) in networking and telecommunication systems from Princess Nora University.

Inez Zheng

Inez is a Grid Connections Engineer at RES Australia with experience in system optimisation, technical risk management and computational mathematics/design. Inez previously shadowed the UK counterpart to learn and implement machine learning power curves for Australian projects in operation. She has worked on multiple RES projects across the 22GW portfolio, including Murra Warra Wind Farm, Lal Lal Wind Farm, Bomen Solar Farm, and Emerald Solar Farm. Inez holds a Masters of Engineering (Electrical and Electronics Engineering) and a Diploma of Languages (German). She is an advocate for environmental awareness and female leadership in STEM.

Enn Vinnal



Enn runs Wireless Frequency Studio, a consultancy specialising in assessment of spectrum sharing and co-existence between different radio services. Previously he worked for Telstra in radio system and antenna performance assessment. He is past Chair of the ComSoc Chapter and of the Victorian Section and is the current Chair of the Vehicular Technology Chapter.

Priya Rani

Priya is an Associate Research Fellow at A2I2 at Deakin University. In IEEE, she was the Co-Convenor and founding Chair of IoT Community at Victorian Section in 2020. Currently, she is serving as Treasurer at Victorian Section. She is also a STEM Ambassador with Science and Technology Australia, promoting and raising awareness of STEM across Australia.

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