Fall Newsletter

September 2020

Welcome Message from Editor and Team!

We welcome you to September issue of IEEE Newsletter, Toronto section. By launching this newsletter, we intend to cover IEEE achievements and success stories specific to the Toronto area.

In this issue, we will share a very sad news of death of Canada's computer pioneer; Leonard Casciato. We will share brief biography of his life as conceived by his son, Paul Casciato**. (Page 9)**

Join me congratulating our "Industry Engagement Committee" on their success by winning an award. **(Page 4)**

You'll also enjoy reading two short articles about "Negative Spaces" and "Sustainable Wireless Sensing". **(Page 4)**

In this Edition

We encourage you to "Come Share your story with us!" and we will cover your story, in order to portrait and acknowledge member' achievements. You can find newsletter's previous issues here.

You can explore our Library to access links to various newsletters, resources and chapter activities.

If you have any questions, suggestions, or concerns, please address them to the editor; Fatima Hussain at fatima.hussain@ieee.org. We hope to hear from you, and we welcome your feedback!

Meet Our Distinguished IEEE Members

Let's meet members of the Cecic family serving IEEE Toronto for two generations.

Dennis Cecic, Chair of the Computer Chapter

Dennis is a Senior Technical Training Engineer with Microchip Technology Inc. He is both a subject matter expert in 8, 16 and 32-bit Microcontrollers, Embedded Firmware and IoT applications, as well as an instructional designer, helping other Engineers design effective e-learning experiences. He holds a B. Eng. Degree in Electrical Engineering from Ryerson University.

Let's hear rest of the story from Dennis!

I joined IEEE as an Engineering Student while studying at Ryerson in 1988. I began my professional involvement with the IEEE Toronto Section in 1998 as Vice-Chair for the Instrumentation & Measurement Chapter. I've held various roles throughout the years and am currently serving a second term as Chair of the Computer Chapter.

For me, IEEE has always been about networking with peers and sharing my expertise. The biggest impacts to my career have resulted from my involvement in running and participating in local chapter events. You never know who is in the audience…

My advice to young professionals is to get involved! If you have something to share, and you're passionate about engineering, consider presenting a topic in your area of expertise at a local chapter event. I gave a technical presentation to my chapter on a new DSP chip several years ago, which led to work in curriculum development and teaching at a local college – all because the department chair had attended the talk!

In addition, running Chapter events provides opportunities to develop your organizational and communication skills, and gets you recognized by senior engineers in the local technical community. That will serve you well as you navigate through your professional engineering career!

Trent Cecic, Social Media Coordinator

Trent Cecic is a 4th year Marketing Management student at Ryerson University. Interested in finding a degree related to human behaviour, he found the field of marketing and became interested in how businesses observed and handled the behaviours and attitudes of consumers. Trent's main interest is on brand management and how businesses develop their social media presence. Now he currently runs IEEE Toronto's social media presence on Twitter, Instagram, and Facebook.

Let's hear rest of the story from Trent!

I'm still very much a new member, having only recently joined as a student member at the end of May 2020. In the past year, I've been networking at marketing events and expanding my professional network in hopes that I could get an opportunity to gain experience in brand management or learning how companies manage their social media accounts. In mid-May, my father (Dennis Cecic, Computer Chapter Chair) approached me and proposed that I take up a volunteer role in IEEE Toronto to help manage their social media presence. I was very excited at the opportunity to gain some real-life experience, and after a few meetings with Dustin, I am now officially the eNotice Coordinator for IEEE Toronto. I am eager to promote the section and look forward to working with other members of the communications team!

What's New!

Find Us on Twitter and Instagram!

IEEE Toronto will now be posting information on events and other news for IEEE members through their social media as well as the newsletter and website.

Below are the links for each account:

Twitter: https://twitter.com/IEEEToronto

Instagram: https://www.instagram.com/ieee_toronto/

New Positions in IEEE Toronto!

Educational Committee member!

Puica Nitu, M.Sc. P.Eng., SM IEEE, CIGRE

Congratulations! IEEE Toronto, Industry Engagement Committee

IEEE Toronto Section feels honoured for winning the Industry Engagement competition and receiving the award. Special congratulations to Youhan (Monsoon) Fu.

The significance of negative space or holes are more important than you think!

Alexander Ferworn

Most people don't think much about what isn't there. We don't tend to look at a scene and pick out empty spaces—we ignore them. Our attention is drawn to physical objects we can see and interact with. This makes a lot of sense as we navigate in a world full of sharp objects, hard surfaces and a fragile human body. We have been conditioned to think of empty space as safe

space—what isn't there, normally can't hurt us. In a field like robotics, where collision avoidance is a common topic of research, physical objects are sensed and described with precision, providing exact locations for edges, heights and similar features, while empty space isn't characterized at all except being renames as, "path".

Other endeavors have put a lot more thought into negative space. In art and photography, negative space is a feature in itself that forms an interesting or artistically relevant shape. In some cases, the negative space can be used to artistic effect as the "real" subject of an image as the physical objects in the image are deemphasised.

In architecture, positive spaces are those that are wrapped in a built shell specifically designed to contain it, while negative spaces are those that are left behind—where dust bunnies collect, unused and unusable spaces that are a side effect of the positive space.

As a researcher with interest in Urban Search and Rescue (USAR), one can easily extend the notion of negative space to the rubble of a collapsed building for a positive reason: negative spaces are where the surviving former occupants of the building will be trapped and hidden after the building's collapse due to any number of reasons including poor construction, earthquakes, bombs, or any number of other factors that lead to the collapse. A natural tendency in USAR operations is to closely examine the structures that are formed after the collapse of a building has taken place—forming rubble. First responders and structural Engineers do this because searching for people trapped in rubble is a dangerous undertaking as parts of the building may continue to collapse and cause a very dangerous work environment. To make the rubble pile as safe as possible considerable and time consuming efforts are made by emergency task forces to stabilize the rubble pile by adding shoring and other stabilizing structures. However, one must remember that these efforts are made to keep the search teams and other workers on the pile safe. In effect the necessary work on the positive space of the rubble has a tendency to overshadow the negative space of where the people are actually trapped. These negative spaces are called "voids" and provide the temporary shelter where survivors become trapped and await rescue.

We argue that the characterization of these structure voids are extremely important from both a rescue perspective as people's lives are at risk. However, also because concentrating on the characteristics of voids may have several significant computational advantages including, 1) voids are where the people are so we should reason about them, 2) voids can be described independently of the context of the rubble the voids are found in.

Our work has been largely theoretical to date and is described in [1] and [2] where RGBD sensors were employed to detect and naively characterize holes in simulated disaster rubble. We are not the only ones who have tried to examine the characteristics of this particular form

of negative space. [3] has used Ground Penetrating Radar to try and locate and characterize holes in rubble as well.

We believe the next steps in elaborating on negative space in the USAR context is to discover, improvise or coopt a lexicon that can be used to describe a hole. Clearly there are important factors that make rubble holes interesting (depth and physical shape come to mind) but they are very difficult to describe as there is no language that addresses the physical manifestation that is a hole and the complexity of it.

Clearly holes are important, shouldn't there be language elements that describe them consistently?

References:

[1] Kong, C., Ferworn, A., Tran, J., Herman, S., Coleshill, E., & Derpanis, K. G. (2013, October). Toward the automatic detection of access holes in disaster rubble. In 2013 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR) (pp. 1-6). IEEE.

[2] Kong, Christopher, et al. "What is a Hole? Discovering Access Holes in Disaster Rubble with Functional and Photometric Attributes." Journal of Field Robotics 33.6 (2016): 825-836.

[3] Da Hu, Shuai Li, Junjie Chen, Vineet R. Kamat, Detecting, locating, and characterizing voids in disaster rubble for search and rescue, Advanced Engineering Informatics, Volume 42, 2019

About Author!

Alex Ferworn is a Professor of Computer Science. He earned his PhD from the U of Waterloo, his MSc from the U of Guelph and his B. Tech from Ryerson. He serves as the Graduate Program Director (GPD) of The Master of Digital Media program and the GPD of the graduate programs in the Department of Computer Science where he is also an Associate Chair. He is the creator of over 30 Certificate and other programs in the Chang School. Previous roles are varied and include; progressively senior roles in telecommunication companies, service as a police auxiliary and as an infantry Company Commander in the Canadian Forces Reserve.

His research focuses on "Computational Public Safety". He seeks out collaborations with individuals and groups in fields as varied as Archaeology, Law Enforcement, Physics, Disaster Management, Fire Protection, English, Early Childhood Education, Performance and Fashion. In 2019 his work in finding lost people living with dementia was featured at the CRAM Festival.

Sustainable Wireless Sensing and Communications

Xavier Fernando

Wireless access technologies have become ubiquitous and it is no-longer about just voice or data or even video communications. Myriad of new value-added wireless services, from wireless sensing based IoT systems to low latency autonomous vehicle guiding, appear every day that has transformed our lives.

A prominent group of these are location-based services (LBS). We have been using them in simple day to day activities such as calling for an Uber vehicle to emergency 911 wireless calls. LBS also plays a critical role in advanced smart city services, intelligent transportation systems and autonomous vehicle maneuvers.

Realizing the importance of LBS, Ryerson Communications Lab (RCL) (www.ee.ryerson.ca/~fernando) has been researching in the realms of wireless positioning technologies for the past many years. Our work in this area started with our collaboration with the mining industry.

Mining contributes tens of billions of dollars to Canadian economy. However, low paid miners, mostly working in remote areas, are exposed to much higher occupational hazards than those in other industrial sectors. RCL has pioneered in providing several solutions to address the issues related to wireless sensing, reliable communications and tracking in underground mines, tunnels, and in other confined spaces [1-2]. RCL has received over $1.5 Million $ in research grants for underground communication systems research.

RCL recently collaborated with another Ryerson incubated start-up company in developing accurate indoor positioning solutions using Ultra Wideband radio signals and machine learning algorithms. The developed system is expected to automatically keep track of hundreds of items in an industrial warehouse environment. Tens of centimeter localization accuracy with prolonged battery life for sensors were achieved. RCL received over $600,000 in research funding for this work and filed two patents for the inventions [3-4].

The Energy Harvesting Myth

One major challenge in wireless sensing is powering the sensor nodes. The cost of maintenance and pollutions due to used batteries exponentially increases with the number of sensors. The network performance would significantly deteriorate with the demise of sensor nodes. RF energy harvesting is often seen as a viable solution to prolong sensor lifetime without additional hardware.

However, our research has shown despite popular belief and numerous publications, RF energy harvesting from other wireless user-equipment such as cell phones is not feasible [5]. Collected energy would be too small to make any practical sense. However, harvesting electromagnetic energy from high power sources such as TV transmitters and radio stations is feasible [5].

Photonics Techniques for Wireless Communications

Optical communication has been traditionally confined to fiber networks and seen as a wired (fixed) solution. However, photonic techniques can greatly enhance wireless communication systems and networks in multiple ways. One approach is the transmission of radio signals over fiber to serve the access front. These radio-over-fiber (ROF) based Fiber-Wireless (Fi-Wi) systems can be great asset to rapid deployment of high capacity Micro and Pico radio cells [6]. Hence, fiber optics is expected play a vital role in upcoming 5G wireless networks.

Another fast emerging optical-wireless technology is the Visible Light Communications (VLC). VLC is growing fast with the widespread deployment of LED based lighting solutions in building, streets, parking lots and especially vehicles. VLC spectrum has a few Tera Hertz of bandwidth and does not cause electromagnetic pollution (interference). VLC will hence play a major role in V2X communications aiding intelligent transport systems and autonomous vehicle maneuver [7]. RCL has also been researching in Fi-Wi and Optical-Wireless Communications for many years.

References:

[1] Wisam Farjow and Xavier Fernando, 'System and Method to Control Amplifier Gain in a Radiating Line Communication System' Canadian Patent, serial number 2789768, Ref # P45412, September 2012

[2] ACM http://cacm.acm.org/news/96717-researcher-develops-underground-wireless-communication-for-mines/comments

[3] MOEINI, Peyman; LI, Xiaofeng; FERNANDO, Xavier Navajothy; and JASEEMUDDIN, Muhammad, 'A Mac Layer Protocol for Smart Indoor Inventory Management System' United States Provisional Patent Application No. 62/958,475, Filed: January 8, 2020

[4] MOEINI, Peyman; MURARY, Ryan; FERNANDO, Xavier Navajothy; and JASEEMUDDIN, Muhammad, 'A Mac Layer Protocol for Smart Indoor Inventory Management System' United States Provisional Patent Application No. 62/958,475, Filed: January 8, 2020

[5] Arif Obaid, Fatima Hussain and Xavier Fernando,' Adaptive Switching for Efficient Energy Harvesting in Energy Constraint IoT Devices' Proc. of the IEEE Vehicular Technology Conference, 24-27 Sept. 2017, Toronto, ON, Canada, DOI: 10.1109/VTCFall.2017.8288391

[6] Xavier Fernando, 'Radio over Fiber for Wireless Access – From Fundamentals to Advanced Topics', ISBN: 978-1-118-79706-8, August 2014

[7]. Xavier Fernando and Hasan Farahneh, 'Vehicular Applications of Visible Light Communications', IOP Publishing Ltd, Nov. 2020, Online ISBN: 978-0-7503-2284-3; Print ISBN: 978-0-7503-2282-9

About Author!

Xavier Fernando has (co-) authored over 200 research articles, three books (one translated to Mandarin) and holds five patents. He is the Director of Ryerson Communications Lab that has received total research funding over $3.2 Million since 2008. He was an IEEE Communications Society Distinguished Lecturer. He was the Chair of IEEE Toronto Section and IEEE Canada Central Area. His work has won 30 awards and prizes so far including IEEE Microwave Theory and Techniques Society Prize in 2010 and IEEE Sarnoff Symposium Prize in 2009.

He has been in the organizing/steering/technical program committees of numerous conferences and journals. He was the Chair of IEEE Toronto Section and IEEE Canada Central Area. He was also a member of IEEE Region 7 Board. He was the General Chair of conferences such as IEEE International Humanitarian Technology Conference (IHTC) 2017 and IEEE Canadian Conference on Electrical and Computer Engineering (CCECE) 2014. He was a Member of Board of Governors of Ryerson University during 2011-12. He has received 7 awards from IEEE for his service so far.

Last of Canada's Computer Pioneers Dies

Final stop for Canada's traffic and public transport pioneer!

The engineering whiz kid whose technological innovation created computer-controlled traffic systems and revolutionised public transport in Canada and across the world came to his final stop in a Kitchener care home on Wednesday.

Leonard P. Casciato (BA (Hons), MA, P.Eng) is the last member of the team who designed and built Canada's first computer between 1948-1950, while he was a student at the University of Toronto.

A decade later, he designed and installed the first computerised traffic control system in the world in Toronto in 1962, and in the 1970s began the electronic revolution at the Toronto Transit Commission that now allows it to safely whisk millions of commuters to work every day.

His string of patents and work informed everything from the use of early cellular communications to track vehicles, to the free-flowing movement of traffic in cities, automated reservations for airlines as well as inventory, accounting systems and automated production lines.

Born near Christie Pitts in 1925 to his Scottish mother Jean (nee Jane Urquhart) Casciato, a former WWI munitionette and Adam Casciato, a local Toronto football and baseball champion who worked as a luggage-maker for the department store Eaton's, Leonard was a life-long striver.

Top of his class at St. Peter's Catholic primary school near Bathurst and Bloor, Casciato won an academic scholarship to St. Michael's College School. His competitive nature and drive earned him a gold medal for coming first in every subject for four years running.

Alas, in the fifth year, he fell off his bicycle on his way to a French exam, broke his arm, turned up late and failed to top the class. His unsparing Scottish mother never let him forget that he was always one medal short of a full set.

The story of the Casciato family is woven into the fabric of Toronto and Canada.

His grandfather Enrico, an illiterate peasant from Abruzzo, Italy, immigrated to Canada just after Italian unification and around the same time as Canadian confederation. He was a labourer who dug the foundations of what is now "old City Hall" and earned extra money as an organ grinder with a monkey.

His son and Leonard's father, Adam was a top sportsman, excelling on the sports field and winning championships for local Toronto amateur teams at football and baseball. He enlisted in the Canadian Cavalry in WWI, but an injury as a result of falling from a horse spared him the horrors of the war.

Although he grew up during the Depression, followed by World War Two and money was tight, Leonard's academic prowess afforded him a place at the private Catholic St. Michael's College School run by Basilian priests and then located at Bay and Bloor.

Another scholarship made it possible to carry on to the University of Toronto to study a five-year maths and physics programme starting in 1943.

During his school years, the world was ablaze with World War Two and Leonard burned to do his bit for Canada. He took a break from his studies at the University of Toronto to enlist in the Royal Canadian Air Force as soon as he was of age, but the war ended by the time he could ship overseas as a fully qualified pilot.

"I was disappointed," he said. "I wanted to get into a really hot plane like a Hurricane or a Spitfire."

So he resumed his place at the University of Toronto, where he was asked to get involved in building Canada's first computer alongside one of Canada's other computer pioneers and future business partner Josef Kates.

The two worked to create UTEC, the University of Toronto Electronic Computer at U of T's Computation Centre, in a team, which also included Canada's first female computer scientist Beatrice "Trixie" Worsley, a University of Cambridge protégé of enigma code-buster Alan Turing.

The "Push-Button Brain" as the Globe & Mail called it was functional by the fall of 1950, making about 5,000 calculations a second and running for periods of up to eight hours without hardware fault. Input was handled via a Teletype machine and information storage was handled by several extremely delicate Williams vacuum tubes.

"You comb your hair and that would be enough to destroy the contents of the electrostatic storage tubes if you weren't careful," said Casciato. "That is where my practicality came in, because I was able to shield, protect, and otherwise reinforce the electrics to make them function well."

Shortly after university, he, Kates and another UTEC veteran Bob Johnston set out to form a new company called Digitronics.

The trio attempted to get funding to build their own computer for business purposes that could be employed for use in inventory control, automated reservation systems, accounting, automated process control in manufacturing and office filing systems. Their ideas were considered radical at the time.

But they attracted the attention of Robert Watson-Watts, the inventor of radar, who employed Casciato and Kates in his Montreal high-tech consulting company Adalia Ltd, where the pair worked together on the introduction of computerised systems for Air Canada's forerunner, Trans-Canada Airlines.

The relationship with Adalia eventually broke down over their interest in computer hardware and in 1954 Casciato and Kates formed KCS Data Control Ltd alongside a new partner Joe Shapiro.

The company became Canada's most successful computer consulting company in the late 1950s and 1960s, playing an important role in the technology decisions of big business and the Canadian government, including real-time process control technology for the Canadian petro-chemical industry and a string of patents.

But the biggest success for KCS and Casciato as its Chief Engineer was the design and deployment in Toronto of the world's first computerised urban traffic control system in Toronto in 1962.

Its successful deployment was celebrated by the American Society of Traffic Engineers, which held its annual conference in Toronto in 1964, the first time it had ever been held outside of the United States.

Toronto's Financial Post called it "magic", the Globe and Mail and the Toronto Star referred to it as the "electronic brain" that could solve Toronto's traffic problems in seconds.

Success and more work came into the firm to automate production facilities at places as far flung as Norsk Hydro in Norway.

Casciato travelled on business to Switzerland, Germany, France and across Europe. He made friends in Parisian society, went golfing with the President of the Bank of France, met Pablo Picasso's muse Francoise Gilot and impressed the great and the good with his technological ideas.

But Kates and Casciato eventually fell out over business differences, the KCS partnership was dissolved and sold to Toronto accounting firm Peat Marwick, which later became the global firm KPMG.

Casciato and Kates went their separate ways for several years.

Joe Kates was the Steve Jobs to Casciato's Steve Wozniak-like technical brilliance, an impresario whose drive for innovation spurred Leonard's technological ingenuity.

Kates went on to shine in the limelight, capitalising on the KCS success to become Chairman of the Science Council of Canada and receiving the Order of Canada.

Embittered and enriched by the break-up of their partnership, Leonard used the next few years to pursue his other passions.

He loved flying and was a keen Francophile, speaking fluent French, studying at the Sorbonne in Paris, taking his family on long family car trips to Quebec and enjoying life-long membership of Alliance Francaise.

His insatiable interest in planes led him and a friend to re-build by hand a Tiger Moth biplane from the parts of seven wreckages. He joined the Downsview Flying Club and was honoured to be made a member of the Officer's Mess by the RCAF pilots still stationed there and kept a plane there for many years, before it closed down.

At home in Toronto's North York, his basement workshop was always a hive of Thomas Edison-like activity with lasers, machines, tools, models and other items of technological wonder always under construction.

In the early 1970s, he was called back into service by Peat Marwick when the Toronto Transit Commission wanted to create a computer and communications system to link up second-largest transit system in North America.

Casciato was brought in to help design and create the TTC's Transit Universal Microprocessor system or TRUMP, the forerunner of the communications and computerised equipment that now runs the system.

The appearance of computer-like terminals on buses and trams across Toronto came after work, which required Casciato to obtain a bus driver's licence so he could test out the system.

He could often be found driving his children around the bus depot in downtown Toronto on weekends to artificial stops where they could get on and off to simulate passengers monitored by the system.

He was once laughed out of the TTC boardroom for proposing they buy up the cheap radio frequencies, predicting they would form the infrastructure of a modern telecommunications revolution that would provide enough income to make public transport free for everyone in Toronto.

One wonders who is laughing now.

Having been at the start of the computer revolution, Casciato remained a consultant for hire for many years.

But he became disillusioned with the computing industry, considering the focus on complicated programming languages to be a distraction from computing's real purpose. To make life and work easier for humans.

He was scathing about computer programmers and the complicated early prototypes of business and personal computers, which required sophisticated knowledge of programming as awkward and unworkable for practical use.

"If computer programmers designed cars, you'd have to get out to change gears while driving," he once said.

But he was an early adopter of Apple computers, buying its first commercial edition and praising Jobs and Wozniak for the built-in intuition of an operating system that was designed to make it possible for anyone to use.

In his personal life, Leonard was a passionate Canadian.

His grandfather immigrated to Canada with nothing. His father worked in the basement of the Toronto shop of Canada's iconic department store Eaton's at the corner of Yonge and King.

His own story was a testament to the opportunities open to millions of immigrants who flocked to Canada to build a new life for themselves and their families.

At one point his corner office in Toronto's gleaming new Simpson Tower, built for the Who's Who of Canadian business, cast its shadow over old City Hall where his grandfather wielded pick and spade and the shop where his jovial dad made hand-tooled luggage.

On business trips around the planet, automating plants and processes, Leonard carried a personal set of luggage made by his father that was embossed with his name in silver.

Leonard was a life-long Liberal and an ardent believer in Prime Minister Pierre Trudeau's vision of a cultural mosaic, which could transform the destiny of anyone willing to grasp the nettle.

As a child, he suffered at the hands of discrimination that affected him his whole life.

His mother's Scottish relatives openly referred pityingly to Jean's unfortunate marriage to "the dago" and referred to Leonard as "the little dago".

As a young man he wore a "wind-cheater" jacket zipped all the way up to his neck and pulled down to his hands as he cycled around the city even in the height of summer, so passersby couldn't see his olive skin.

He often recalled a sign at Toronto's popular Hanlan's Point beach in the 1930s that read: "No Jews, No Dogs and No WOPS".

He never forgot the burning injustice of discrimination and set out to prove to everyone, that as he said: "It's what you do, that defines you."

His first business partner, Kates, was a Jewish refugee who escaped the Nazis. Many of his school friends didn't return from the war, yet the two of them employed a former German U-Boat commander at KCS.

When this former POW captured off Canada's coast arrived at the door of Leonard's office and clicked his heels in military fashion, Leonard looked up at him and said: "You don't have to do that anymore, this is Canada."

He was a big fan of Johnny Lombardi's multicultural CHIN radio and later television, which allowed Leonard to shed the childhood shame of his background and share pride in his Italian heritage with his own children.

He went to Metro Toronto's multi-ethnic Caravan festival every year, relishing the chance to enjoy the rich offerings of a week-long jamboree which showcased the food, music, and other cultural traditions of the immigrant population in Toronto. His town.

He would visit Toronto's Little Italy later in life, for a meal in an Italian restaurant and a wander past the old house where his grandfather used to apologise to his clever young Canadian grandson for speaking in "this monkey language" with fellow Italian immigrants.

In the late 1950s, Leonard married a sweetheart from St. Peter's school, Loretta Carey. She was the descendant of Irish immigrants working in the timber camps and nickel mines of Northern Ontario, sent to live with her maiden aunts in Toronto after a family tragedy that killed both of her parents.

The two set about making a home for themselves in North York, with plans for a big family. Loretta became a charity figure with the Catholic Women's League and the Catholic Children's Aid Society (CCAS), Unicef and others.

Unable to conceive children, they adopted four infants through the CCAS. Their adoption was never a secret.

"I was already at the charity, so I just took all the best babies home to love," she would tell them when asked about their adoption.

She and Leonard taught all their children to be fiercely independent, changing the children's stars as they had changed their own

Leonard could also be a hard taskmaster and he was cursed with a volcanic temper.

But he also strove to quietly help improve the maths skills of a generation of Canadians from behind the scenes.

Math homework sessions with his own children often ended with long phone calls to his old St. Mike's chum John Egsgard, winner of the Descartes medal for mathematics education and the author of the math textbooks used in high schools across Canada and other parts of North America.

"Look John, page 38, problem four where it says X equals 5 is clearly wrong, X is 3, how about…" was a typical start to their conversations.

Loretta died in 2005 of cancer in the house where she had raised her family, with Leonard on the sofa next to her bed.

Leonard lived alone in the family home until Alzheimer's and Parkinson's forced him to move to a care home in Kitchener near to where two of his children live. He remained there until his death on June 3, 2020.

He leaves behind his four children: John, Paul, Anne Marie and Mary-Ellen, three of his four siblings: Evelyn, Joe and Anthony, as well as seven grandchildren: Adam, Michael, Lauren, Jack, Max, Michael and Colleen.

Get Involved with Us!

IEEE Toronto section is looking forward to hearing from you. your contributions are welcome to this monthly newsletter. We invite our members to share and submit:

- Short Story (about IEEE members, WIE members)
- News items and Affinity group reports

- Technical Articles/Blogs (Brief discussions of cutting edge research, new technological tools, topics of your choice)

Submission

Articles should be submitted in Word format. Word count for News items, Affinity group reports is 50 to 200 words and for blogs/ articles is 500 to 800 words.

Editor: Fatima Hussain
Contact: fatima.hussain@ieee.org

Webmaster: Melanie Soliven
Contact: msoliven@ieee.org