A Trailblazer in the World of AI

Helen Meng, (Class of '83) is a trailblazer in her field. She represents the small cohort of women who make up only 12% of the Artificial Intelligence (AI) research world and 26% of the technology workforce, and is a recognized scholar in the field of multilingual speech and language processing, multimodal human-computer interaction and Big Data decision analytics.

Helen completed all 13 years of her primary and secondary education at DGJS and DGS. She received the S.B., S.M. and Ph.D. degrees in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology (MIT). She is presently Professor of the Department of Systems Engineering and Engineering Management at the The Chinese University of Hong Kong.

Q: Were there any factors which guided or motivated you towards your present career path?

After completing sixth form, I was accepted by Hong Kong University's medical school which was a very promising choice. But an unconventional opportunity availed and I decided to defer my pursuit of medicine to study at MIT, which turned out to be an unusual and exceptional experience. For my senior year project, I designed an electrically tunable waveguide that can transmit electromagnetic waves for hyperthermia in cancer treatment. This led to my receiving the Ernst A. Guillemin Thesis Award for the best undergraduate thesis in electrical engineering that year. It was very gratifying to realize that engineers can also contribute to medicine.

For my graduate studies and subsequent career development, I channeled my fascination in the research of signal processing and pattern recognition into speech and language. Speech is a most interesting signal. It is the most natural form of human-human communication. Not only can it encode what the speaker is trying to say, the listener can also derive information about the speaker's gender, age, ethnicity, socioeconomic status, and emotions. It can even provide information about the speaker's physical, psychological and cognitive health. The ultimate goal of my research is to make human-computer (or human-AI) conversations as natural as human-human dialogs, and enable automatic extraction of pinpointed information from massive digital archives. The biliteral and trilingual environment in Hong Kong offers a most interesting linguistic environment for my work and has enabled our development of an exciting new technology recently on *voice conversion*. Consider the mechanistic, synthetic "voice" of the late Professor Stephen Hawking -- by utilizing some amount of speech recordings from a chosen target speaker, we can convert a synthetic voice to sound as if it were spoken by any chosen target speaker. This software can perform cross-gender and cross-language voice conversion as well and, can serve as an assistive technology that makes synthetic speech sound more personalized and human for those with communicative impairments. As a testimony to our work, we received the best paper award from a major conference in our field recently.

Helen's classmates from DGJS all the way from Primary 1, as well as her daughter, also from DGJS, congratulating her on the receipt of the Outstanding Women Professionals and Entrepreneurs Award

Q: Please share with us your experience with Big Data and AI?

AI is and will continue to be greatly empowered by Big Data. Its potential threats arouse serious concerns for many people, but if we can harness AI and Big Data well, it can also present significant, life-improving breakthroughs.

Researchers in my field often say, "there's no data like more data". For example, when different people say the three letters "DGS", the speech signals are all different, because they come from different voices, intonation, background noises, etc. By capturing more data, we can eliminate the variability and interference, and extract the common patterns from the data more accurately; thus creating a more powerful engine for use.

One example of AI/Big Data application is in my work on dysarthric speech recognition. Dysarthria is a speech disorder, characterized by unclear articulation, that may be related to stroke, Parkinson's Disease, traumatic brain injuries, etc. To benchmark our AI algorithms on a global scale, we began by experimentation with English dysarthric speech recognition. So far, our work has achieved the best results in English dysarthric speech recognition globally, using AI algorithms which perform better than the average human. In order to serve our own community, I have been collecting Cantonese dysarthric speech data in the past few years. I am very touched by all our subjects who volunteered their hard efforts to provide dysarthric speech recordings for our research. Our aim is to build an effective dysarthric speech recognition engine for the Cantonese language and to reengineer our technologies for applicability to Cantonese.

Our team has also worked on the use of AI to help in the earlier prediction of Alzheimer's disease (AD), based on the daily activity rhythm of elderly persons. Data collected on smart wristbands worn by over a thousand elderly persons is used to develop machine learning algorithms that can analyze the data to perform classification and hopefully lead to earlier prediction of AD.

In addition, we have developed a digital version of Hong Kong Hospital Authority's Communication Book to replace the paper version, which has been used by the speech impaired to point to pictures in order to communicate. In comparison, our Electronic Communication Book is more widely accessible as it can be freely downloaded on a tablet and is also very easy to personalize. AI has enabled this e-book to "speak" in Cantonese and 10 other languages, and I am happy to say that our work has received an award on Smart Inclusion from Hong Kong ICT Awards last year.

Helen received an award for Smart Inclusion from the Hong Kong ICT Awards for her development of the Electronic Communication Book

Separately, I am now serving on the HKSAR Government's Steering Committee in Electronic Health Record Sharing, which is a very important and forward-looking initiative to create a holistic health data repository for every citizen in Hong Kong. This Big Data picture for each patient will enable healthcare professionals to provide better, personalized care. Properly anonymized data with AI-enabled analytics can also be used to identify disease trends, which holds the promise of early prediction and prevention of diseases.

However, it is important not to forget that the more data that is collected and used, the more challenges it poses in terms of security, such as the risks of privacy breach, data corruption and manipulation. Advancement in AI technology is very exciting indeed, but it can be misused from both legal and ethical perspectives. To counter this, I am now working on anti-spoofing technologies to guard against the misuse of voice conversion technologies in impersonation attacks to voiceprint authentication systems.

Helen was panel chair at the Hong Kong Science & Technology Parks Corporation panel discussion

Helen (front row, 5th from the left) in Form 4 Science at DGS

Q: What do you consider as the most valuable qualities you learned from DGS?

I acquired many valuable assets from my DGS education, which proved to be enormously beneficial to my career as an educator, researcher and technologist. They were: having the courage to speak from the heart, both positively and negatively; not shying away from failure and being bold in attempting to solve difficult problems in the face of incalculable outcomes or even likely failure; as well as setting a standard for our personal best so that we are always striving to do better. I am truly grateful to my alma mater for helping me attain these traits.

Q: Do you have any message on career development for our alumnae and students?

The new normal will be multiple careers in one lifetime. There is a common view in career development is that if a person cannot get into a good university or a good degree, he/she is a loser. With the world changing drastically as a result of rapid technological advancement, any one degree or even excellence in a job may not suffice to make a single career last a whole lifetime. AI will disrupt some jobs and there may be a need to transition to another career. However, it will mean that there will be many ways by which one can excel.

Therefore, the right attitude is to stay abreast of the changes and keep up-skilling yourself. Never be afraid to learn new things. Do it continuously. See your career as being progressive and mobile -- it should not and cannot be stationary.

As an educator, I think that since STEM will be so critical in our everyday lives, it should be taught as a core subject in the long run. With the onset of AI technology being pervasive and disruptive, we need to teach the younger generation from an early age how to embrace technology and understand its impact and capability to change our world. To achieve this, I cannot stress more that the way to learn is by building things, to really roll up your sleeves and do it. We refer to that as *maker skills*. Making goes hand-in-hand with *design thinking*, i.e. thinking creatively to design solutions to problems; and *computational thinking*, i.e. thinking logically, procedurally and systematically. Coding and robotics courses are good training grounds for youngsters. In addition, the whole world needs to think about the ethical and social implications of new and emerging technologies, in order to establish policies and guidelines that ensure ethical use, and prevent misuse.

I am very happy to see DGS girls taking initiatives in STEM projects and participating in STEM competitions. I am even happier to see that our school is investing significantly in enhancing the infrastructure and facilities for STEM education. To that end, I would like to see DGS girls not shy away from, but embrace technology and become trailblazers in their own fields.

Activities

Lok Sin Tong Nursing Home Visit

On 23th February 2019, members of the Community Service Sub-committee visited the Lok Sin Tong Hoi Wang Road Nursing Home in South West Kowloon. More than 20 old girls joined the visit, and the Diocesan Graduate Singers also performed. Many members brought their husbands and children to participate in the event as well. To celebrate Chinese New Year and the Lantern Festival, we played festive games with the elderly, such as guessing lantern riddles and passing out Chinese blessing stickers. The Diocesan Graduate Singers sang a few lively oldies, ringing the halls with sounds of joy. It was wonderful and heartwarming to see the elderly enjoying the activities and singing along to the melodies.

Interhouse Netball Tournament 2019

The annual DOGA Interhouse Netball Tournament was successfully held on 9th March 2019. Stepping into the 20th year since its establishment, the DOGA Netball Team received enthusiastic participation from over 60 players and even some mother-daughter duos playing on the same team for their houses. All the teams demonstrated great teamwork and spirit. There were a lot of tight games with very close scores, and their final results had to be determined by the goal averages. Hurrell regained the championship title after 4 years, while Sawyer and Symons came second.

Champion Team Hurrell with their special guest supporter!

DOGA Netball Team Entering its 20th Year

It was with great pride that the DOGA Netball Team held a party on 11th May 2019 to celebrate DOGA Netball entering into its 20th anniversary. Over the years, our players demonstrated sportsmanship and passion in numerous competitions and were rewarded with medals and recognition from the netball community. We are grateful to Anna Wong for establishing the DOGA Netball Team in 2000 and also for sponsoring the celebration party. Players from different generations, including the first DOGA Netball Team players, were present at the event to cherish good memories with the netball family. At the party, the team also made a donation to LOVE 21 Foundation, which is a charity dedicated to bettering the lives of Hong Kong Down syndrome and autism patients through physical activity and nutrition.

Members of the current DOGA Netball Team

Members of the first generation DOGA Netball Team

DOGA Netball Team party to celebrate the team entering its 20th year

WWF Run for Wild 2019

Over 40 DGS old girls and their families participated in the WWF Run for the Wild 2019 on 7th April 2019 at Pak Shek Kok Promenade, Taipo. Participants selected their sponsored funds to support one of the species – panda, tiger, green turtle, gibbon, Chinese dolphin or shark. The DOGA group participated in the 10km Challenger, 3km Fun Run and 1km Family Run. Some of our keen athletes completed the 10km Challenger with good results.

Coco Lin (Class of 2013) was our fastest runner in the 10km Challenger race

Kids and family members supporting the participants

Old girls joining the run

Anna Wong (Class of 1976)
(photo courtesy of Running Biji HK)

Mother's and Father's Day Bracelet Workshop

Alumnae, family and friends gathered for a morning of artsy fun at the DOGA Art Club Mother's and Father's Day event on 4th May 2019. Each of us went home with our own rose charm bracelets, either as a new piece of personal accessory or as a sweet gift for a loved one. Making the charm bracelets not only pushed our creative minds, but we were also challenged by our patience, eyesight and steady hands to work on something so refined and delicate.

Kee Wah Workshops

The Social Sub-committee organised three baking class sessions at Kee Wah on 16th March and 23rd March. The morning workshop was for adults on baking Chinese sweet crispies with cashews (馬仔). The afternoon workshops were on animated cartoon looking fresh milk tart and egg tarts. Some participants enjoyed the workshop so much that they came back for more fun the following week. Each participant received a set of Kee Wah cookies and nougats in beautiful Easter themed boxes as a gift at the end. They learned to appreciate the skills and intricate procedures behind these yummy traditional Chinese snacks.

2019 Cook for Love

On 4th June 2019, over 20 DOGA members and their families gathered in the Home Management Centre at School for "2019 裹糉籌款為公益 Cook for Love" sponsored by Towngas. Participants made over 200 Dragon Boat Festival dumplings to raise funds for The Community Chest of Hong Kong. Members thoroughly enjoyed themselves whilst catching up with old friends. Even the novices became experts in dumpling making by the end of the event!

Finance Group Gathering

DOGA Finance Career Interest Group held a networking event on 21st June 2019 at the heritage setting of LockCha Tea House in Hong Kong Park. Alumnae from across generations and a wide range of financial sectors joined the event to share their career experiences. We were particularly delighted to have alumnae speakers Anissa Wong and Tiffany Tang come share with us the trends and developments of the public sector. All in all a valuable evening of bonding for our finance group members.

Upcoming Events

Month	Event
July	Mango Dome Cake Baking Workshop (July 6); Support of S5 Job Shadowing Programme (July 2-4)
August	DOGA New Members and Entering University Students Gathering (Aug 10)
September	University Group Gathering (HKUST, CUHK and HKU)
October	DOGA Annual Dinner (Oct 18); DOGA Netball League; Finance Group Gathering
November	Diocesan Graduate Singers' Concert (Nov 9); Art Club Event; Medic Group Gathering
December	Art Club Event; Careers Talk; DGS Mini Bazaar; End of Term Netball Match (DOGA vs DGS)

Details of the events will be updated periodically. Please visit www.doga.org.hk to obtain the latest information.

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Joining DOGA:
Any old girl of DGS or DGJS (whether resident or abroad) who has completed at least one academic year at DGS or DGJS is eligible to apply for membership of DOGA Ltd. Details of the application can be found at www.doga.org.hk.

Class Reunion Gathering:
Alumnae who are interested in organising their class reunion gathering at the School, please contact DOGA office for further information.