

SEPTEMBER 2023

# THE VOICE

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# THE VOICE

OF ONTARIO'S ENGINEERS

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Dear Members,

I hope everyone has enjoyed their summer. I know, at times, the heat has been intense, and in many places dangerous, but I still find the summer months a nice change of pace and a time to catch up from all the activity of late spring meetings with various advocacy bodies and engineering regulators from across the country.

I also enjoy the summer months because it affords me the time for some deep reflection on what is changing in the engineering space, it is those thoughts that are informing my message to you today.

In my role as CEO at OSPE, I am always examining the differences between the many regulated professions we have in Ontario (and across Canada). Now, I know there is much that separates many of these professions from engineers, but what I have always wondered is why it is that in most other licensed professions, it is standard practice that employers subsidize the advocacy/member services fees for their licensed professionals.

I assume it is because employers want their staff to be plugged into what is going on in their industry and to be continually improving their professional networks and skills. If that is true, then why is that not the case among engineering employers? To be honest, I cannot come up with a reasonable answer. What I can come up with is a commitment that moving forward, it will be one of OSPE's objectives to get more employers to understand not just the benefits of OSPE to the individual engineer, but the benefits of OSPE to innovative engineering organizations. The more that organizations realize the value, the more meaningfully OSPE can advocate for change for engineers, and the value of engineering design.

This summer I have also become engaged with British Columbia's (BC) effort to decouple the membership and advocacy activities from their engineering regulator and establish a separate advocacy body. I was the only "outsider" appointed to the advisory board establishing the new entity, and I take that as a sign that the success of OSPE is being recognized across the country.

Going through this process, I have been reflecting on the origins of OSPE and that we are still a relatively young organization. We have yet to reach 25 years, yet have already accomplished much and I am thrilled to be able to share what we have learned with the BC advocacy group so they can have a similar impact. I can also let you know that other provincial engineering regulators are watching these developments closely.

As the new BC advisory group is set to establish its first Board of Directors and hire its first employee, I will also be encouraging them to

- Keep advocacy apolitical by being an evidence-based advocacy body for engineers;
- Anchor advocacy in the profession, as engineers are critical to a healthy, vibrant society and a prosperous economy;
- Represent the entire engineering community which means committing to equity, diversity, inclusion, and accessibility, supporting student success, helping graduates find employment and licensed professionals to grow;
- Lead on the right issues and measure in terms of progress as the world needs fast action but often operates in baby steps.

This is exciting work and part of OSPE's mandate to create the best operating environment for engineers. We are happy to lend what we have learned so that other jurisdictions can grow efficiently and effectively. We are all stronger together, especially as we combat challenges that are not so easily left at provincial borders.

As a final note to this message, I would love to know what has been in your thoughts this summer. I wish I could have discussions with more members, so I welcome your thoughts, concerns, and suggestions, based on what you are seeing in the marketplace. Please let us know what's on your mind or what we can do better. After all, we are here to represent you!

Regards,



**Sandro Perruzza**  
Chief Executive Officer  
Ontario Society of Professional Engineers

*Sandro Perruzza*

## NEWS FROM THE FRONT

Since the publication of our last issue, OSPE's staff and volunteers have continued to advocate for a stronger profession and a cleaner, safer Ontario. We recently celebrated the following achievements.

### Policy Win: PEO Removes Canadian Experience Requirement

On May 23, **Professional Engineers Ontario (PEO)** became the first professional regulator in the province to remove the Canadian experience requirement from their licence application criteria. OSPE has advocated for this change for many years, and we are pleased to see PEO take this much-needed action.

The removal of the Canadian experience requirement is a response to recent legislation which aims to remove employment barriers for International Engineering Graduates (IEGs). As well, a 2021 report commissioned by PEO recommended the removal of this requirement from the licensing process.

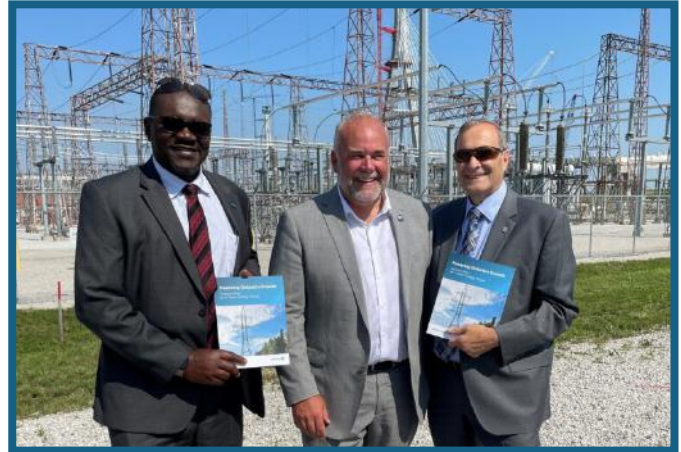
This change removes a major barrier facing IEGs and supports a more equitable, diverse, and inclusive engineering profession. OSPE celebrates this development and will continue to provide a home for engineering graduates at all stages of the licensing process.

### Policy Win: ASHRAE Publishes Standard 241

On July 7, the **American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)** published ASHRAE Standard 241, Control of Infectious Aerosols. This new standard establishes minimum requirements for reducing the risk of airborne disease transmission through exposure to infectious aerosols. OSPE's **Indoor Air Quality Advisory Group** consulted on the development of the regulation, and a number of their recommendations were incorporated into the final edition.

Following our initial consultation with ASHRAE, OSPE has advocated for adoption of this standard with **Health Canada** and the **Canadian Board for Harmonized Construction Codes**. We will continue to advocate with government and regulatory agencies to support safer indoor air and combat the spread of airborne disease.

### Ministry of Energy Launches *Powering Ontario's Growth*



L-R: Mark Emmanuel, P.Eng. (OSPE Board Director), Hon. Todd Smith (Minister of Energy), and Paul Acchione, P.Eng. (OSPE Energy Task Force) celebrate the launch of *Powering Ontario's Growth*

On July 10, **Ontario's Ministry of Energy** released *Powering Ontario's Growth*, the plan that outlines the government's clean energy and infrastructure strategy for 2030, 2040, and beyond. OSPE's experts have worked with the government to shape the future of energy in Ontario, and our efforts are reflected in the launch of this plan.

With a rising population and growing economy, Ontario's electricity demand is on the rise for the first time since 2005, and it is predicted that demand could double by 2050. *Powering Ontario's Growth* outlines various strategies for how to meet this demand sustainably, including expanding and optimizing nuclear and hydroelectric power generation, planning for the province's next competitive electricity procurement (with a focus on clean resources), developing new transmission lines in key regions, and addressing affordability and bottleneck issues.

OSPE has long advocated for transformation in the energy sector, with a focus on sustainability and affordability. *Powering Ontario's Growth* addresses these issues, and we commend the government on laying out a clear direction for the future of energy in Ontario. We will continue working with the Ministry to support their clean energy initiatives.



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\*CPD requirements are set by Professional Engineers Ontario. Based on our understanding of those requirements, OSPE offers a number of activities and courses designed to help the engineering community meet those standards. However, PEO does not endorse or validate any providers at this time. Further, all participants in OSPE programs should consider the requirements of their discipline/practice area in managing their individual CPD strategies.

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# Data Governance and Cleantech in Ontario

## OSPE's Research and Innovation Task Force Publishes Four New White Papers

Forget barbecues and beach days. For OSPE's Research and Innovation Task Force, this summer was full of research on data security, quantum technology, and wastewater management. Between June and August, the task force's Data and Cleantech working groups published four new white papers on data governance and cleantech solutions. Read highlights from each paper below:



### Quantum Technology: A Brief Introduction

Tina Dekker  
July 2023

Quantum technologies have become the next hyped technology, and their unique capabilities are expected to disrupt many industries. In view of a rapidly evolving global quantum ecosystem, the Canadian federal government recently released *Canada's National Quantum Strategy*, which commits \$360 million to Canada's quantum ecosystem to support the three pillars of research, talent, and commercialization. Canada needs diverse talent to establish a robust quantum workforce that can support its growing quantum ecosystem. Much of this talent can be sourced from Canada's existing professionals, but transitioning into the quantum field can be difficult due to the field's unique concepts and jargon. This paper introduces the core concepts and potential applications of quantum technologies.







## Decentralized and Distributed Wastewater Management

James W. Hotchkies, M.Eng., P.Eng.  
July 2023

For most of the past 100 years, the predominant model for wastewater management has been the centralized wastewater treatment (CWWT) facility. However, as our communities are embracing the need for greater sustainability, infrastructure security, and resilience, it may be time to evaluate and implement a more local alternative: a distributed network of decentralized wastewater treatment (DWWT) and resource recovery facilities. These systems represent a viable option to address our growing concerns over water scarcity, infrastructure security and resilience, and the urgent need to provide access to safe and effective sanitation for the billions of people around the world without any infrastructure. This paper outlines the benefits and potential applications of DWWT facilities, and identifies challenges and best practices for deploying a decentralized treatment model.



## Engineering a Sustainable Future: Privacy and Security in the Age of Smart Technology

Safayat Moahamad, LL.B., CIPP/C, CIPM, FIP  
August 2023

The drive towards a circular economy is expediting the era of smart technologies aimed at optimizing the use of natural resources and lowering carbon emissions. But while smart technologies have the potential to deliver sustainable economic growth and move society forward, they can also threaten to compromise personal autonomy, privacy, and security. It is imperative that the transition to a circular economy be inclusive and equitable, and that the benefits derived through ethical use of smart technologies are transparent and accessible to all citizens. The engineering community can help achieve this goal by recognizing the threats of smart technologies and raising awareness about the principles of data protection and Privacy by Design. This paper outlines the personal and societal risks posed by the rise of smart technologies, and identifies how engineers can foster a culture of responsible innovation.





## Sustainable Cybersecurity

Changiz Sadr, P.Eng., FEC, CISSP

August 2023

Sustainable cybersecurity is an approach to information security that combines environmental responsibility, social ethics, and technological resilience. In order to embrace sustainable cybersecurity and foster a greener and more secure digital landscape, it is imperative for organizations and individuals alike to take proactive steps. This includes promoting awareness about the importance of sustainable practices, advocating for the adoption of eco-friendly technologies, and supporting research and development in the field. By collectively working towards sustainable cybersecurity, we can create a harmonious balance between environmental responsibility, social ethics, and technological resilience, ensuring a brighter and more sustainable digital future for generations to come. This paper outlines the benefits of sustainable cybersecurity, identifies challenges and best practices for implementing sustainable cybersecurity systems, and equips engineers to evaluate the sustainability of their cybersecurity infrastructure.



## RESEARCH AND INNOVATION TASK FORCE

Engineers are critical to developing novel solutions to modern challenges. The **Research and Innovation Task Force** supports innovation in Ontario with a focus on CleanTech and Data Governance.

Join this group and foster engineering innovation by...

- Highlighting Canadian leaders in CleanTech and Data Governance
- Proposing policy that facilitates sectoral growth
- Publishing original research in key sectors

Interested in driving Canadian innovation?  
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<sup>2</sup> To be eligible for the offer of \$50,000 of additional Term Life coverage at no extra cost for up to two years, Members must meet the Engineers Canada-sponsored Term Life eligibility requirements: be aged 18 to 65; be applying for Engineers Canada-sponsored Term Life Insurance for the first time without having previously been declined for Term Life coverage by Manulife; be applying and approved for \$25,000 of Term Life coverage or more. Available to Members only (not available on Spousal coverage). For complete details, see manulife.ca/newmember.

<sup>3</sup> Odds of winning depend upon the number of eligible Entries received. Limit one (1) Entry per entrant. Total of twelve (12) Prizes available. Winner(s) will receive an Apple® Gift Card valued at approximately CAD \$750. Correctly answered skill-testing question required. No purchase necessary. Contest closes February 29th, 2024 at 11:59 PM Eastern Time (ET). See full contest rules at manulife.ca/rules75.

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# Engineering Earning Power: What Matters More? Where You Got Your Degree or Your Gender Identity?

Lee Weissling, Ph.D.



If you are an engineering graduate in Ontario, the simple truth is this: where you got your degree is a major factor in determining your income level. However, gender identity plays a large role as well. How do we know this? Earlier this year, OSPE analyzed 2021 Census data according to what types of jobs engineering graduates work in. Now, we have completed further analysis of income levels, measured by whether the degree is from Canada or abroad, and by gender.

## NOTE

This analysis is limited to individuals aged 25-64 years who were employed at the time of the 2021 Census. Also, note that Census data does not distinguish between licensed engineers and non-licensed engineering graduates; therefore, all findings are based solely on individuals having a bachelor's degree (or higher) in engineering.

The types of jobs are defined as:

- **Working in Engineering:** Those working as an engineer or engineering manager (excluding software engineers).
- **Working in Other STEM Fields:** Those working in other STEM professions (including software engineering).
- **Other Professionals:** Those working in non-STEM jobs normally requiring a university degree.
- **Underemployed:** Those working in jobs that do not necessarily require a university degree, including engineering technologists.

*\*Being classified as underemployed does not reflect whether the occupation is lower-paying or lower-status. For example: engineering technologist positions do not normally require a university degree. A college diploma qualifies one to work in the profession, and thus, a graduate with an engineering degree working as an engineering technologist is deemed underemployed. Engineering technologists are certainly viewed as professionals by OSPE. On the other hand, underemployment also includes retail salespeople, construction workers, and taxi drivers, amongst many others.*

## Major Observations

- **For Canadian degree holders working in engineering, the pay gap between women and men is narrow.**
  - » The gap ranges from 8 per cent (for 35-44 year-olds) to only 3 per cent (for 55-64 year-olds).
- **The pay gap between Canadian degree holders and International Engineering Graduates is wide in most job types.**
  - » For those working in engineering, it is as high as 34 per cent (for 55-64 year-olds).
- **The highest-paid Canadian degree holders are working in non-STEM professional positions.**
  - » These roles include policy analyst, professor, and manager / supervisor in finance or public service.
- **For Canadian degree holders, even jobs deemed as “underemployment” often pay well (over \$100,000 annually).**
  - » These include management roles in utility and construction companies, as well as specialized sales positions. An engineering degree may be looked at favourably in hiring decisions, but these jobs do not necessarily require a degree.

## INCOME IN ONTARIO: ENGINEERING GRADUATES WORKING IN ENGINEERING

### Key Observations: Canadian Degree Holders

As reported in the June 2023 issue of The Voice, 40 per cent of Ontarians with Canadian engineering degrees work in engineering. The news for this cohort is positive.

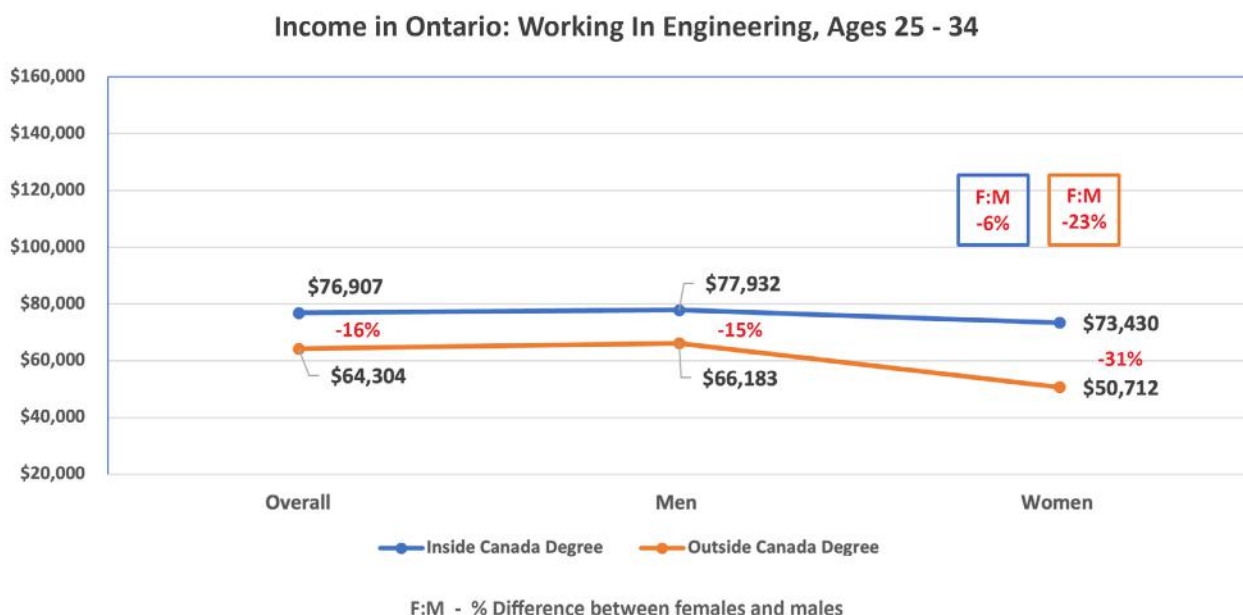
- **As these graduates progress through their careers, their reported median income increases (from \$76,907 for 25-34 year-olds to over \$132,000 for those aged 45+).**
  - » The exception is men aged 55-64, who show a slight decrease in annual compensation.
- **The pay gap between women and men narrows over time.**
  - » The largest gap is for the 35-44 age group, in which women are paid 8 per cent less than men. By 55-64 years of age, the gap is only 3 per cent

### Key Observations: International Engineering Graduates

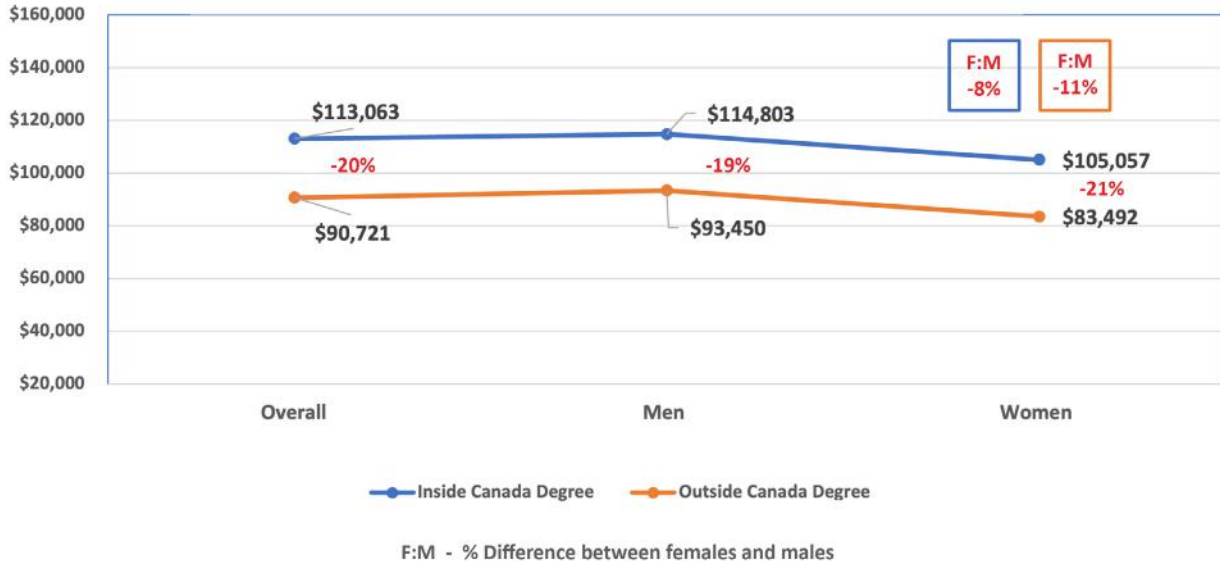
While findings are mostly positive for Canadian degree holders working in engineering, the same cannot be said for International Engineering Graduates (IEGs). As discussed in OSPE’s June report, only 18 per cent of IEGs living in Ontario work in engineering.

- **IEGs who work in engineering are paid far less than Canadian degree holders, even to the point of possible exploitation.**
  - » Figure 1 (below) shows the glaring disparities in income. While IEGs aged 25-34 make ‘only’ 15 per cent less than men with Canadian degrees, this gap expands to 24 per cent for the 55-64 age bracket. Although their median income is just over \$100,000, International Engineering Graduates are still making much less than their Canadian-educated counterparts.
- **The situation is even worse for internationally-trained women; across all age groups, IEG women make 21 to 34 per cent less than their Canadian-educated counterparts.**
  - » Furthermore, IEG women are compensated up to 23 per cent less than IEG men.

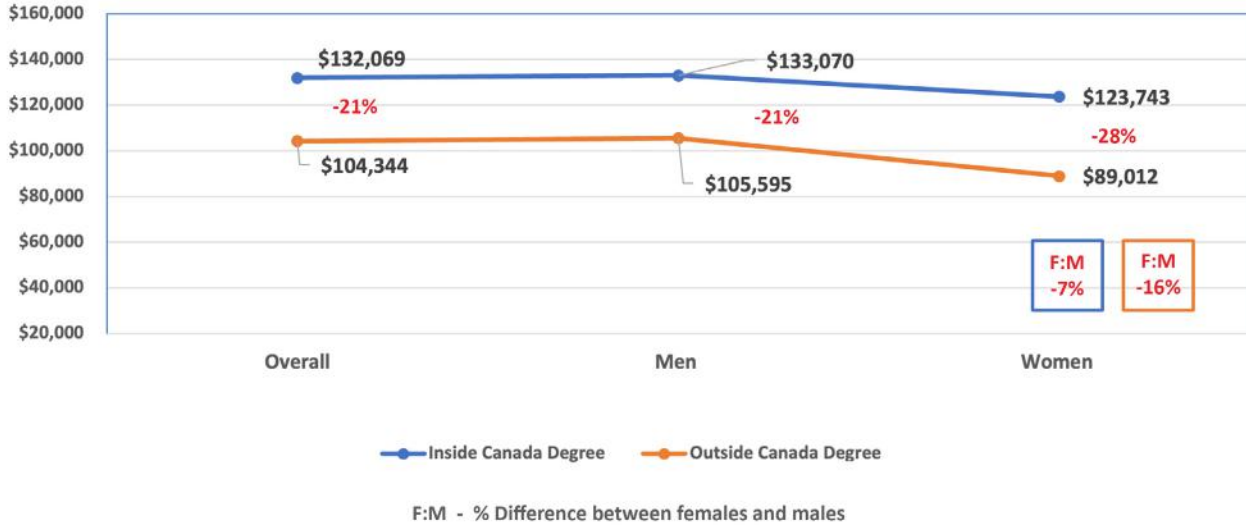
Figure 1: Income of Ontarians Working in Engineering



### Income in Ontario: Working In Engineering, Ages 35 - 44



### Income in Ontario: Working In Engineering, Ages 45 - 54



### Income in Ontario: Working In Engineering, Ages 55 - 64

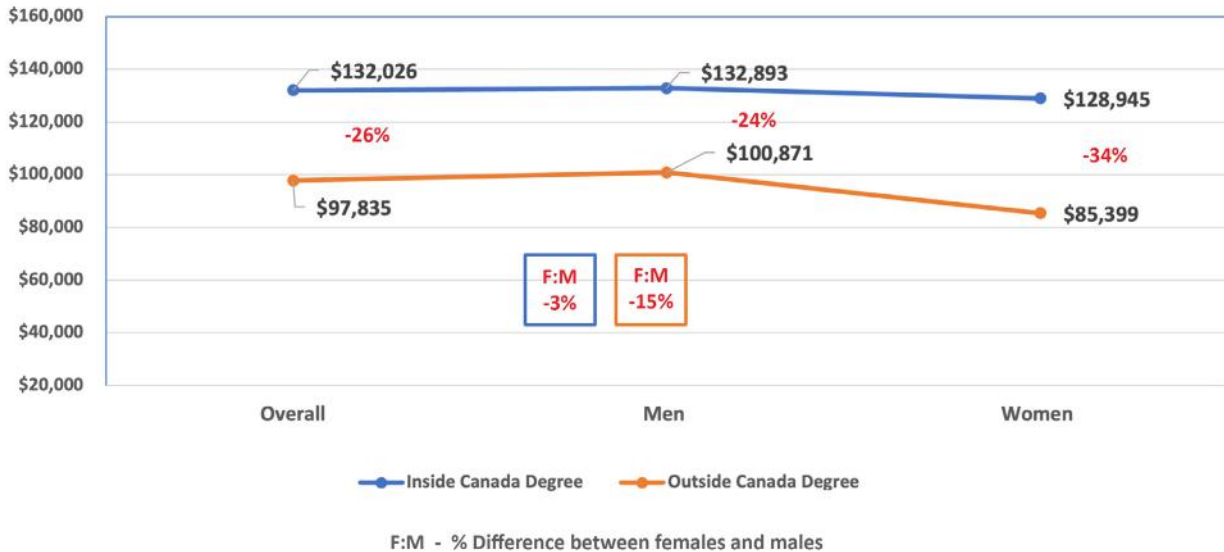


Figure 1 (pages 14-15) identifies income levels for engineering graduates working in engineering across all age brackets. These graphs present the following data for each bracket:

- income gap between Canadian degree holders and International Engineering Graduates
- weighted median income of individuals in the same degree category (Canadian / International)
- income gap between women and men in the same degree category (Canadian / International)

For a further illustration of the income gap between Canadian, International, and male / female graduates working in engineering, consult Table 1 (below).

**Table 1: Median Salaries of 45-54 Year Old Engineering Graduates Working in Engineering (Ontario)**

TYPE OF ENGINEERING POSITION	MEN: CANADIAN DEGREE	MEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)	WOMEN: CANADIAN DEGREE	WOMEN: INTERNATIONAL DEGREE	WOMEN: INTERNATIONAL DEGREE
Civil	\$126,000	\$102,000	-19%	\$121,000	\$85,000	-30%
Mechanical	\$127,000	\$98,000	-23%	\$119,000	\$94,000	-21%
Electrical and Electronics	\$132,000	\$111,000	-16%	\$126,000	\$111,000	-12%
Chemical	\$138,000	\$99,000	-28%	\$119,000	\$60,800	-49%

Source: 2021 Canada Census

The income gap between Canadian and International Engineering Graduates is clear, with the widest gap existing between IEG women and Canadian-educated women working in chemical engineering—fully half the salary.

OSPE considers the glaring pay gaps between Canadian and International Engineering Graduates a possible sign that some IEGs are being taken advantage of. Engineering employers should take it upon themselves to narrow these income gaps.

## INCOME IN ONTARIO: ENGINEERING GRADUATES IN OTHER STEM FIELDS

Non-engineering STEM positions include those in the computer and information technology industries (such as cybersecurity specialists and software designers). Figure 2 (page 19) shows that, for engineering graduates up to age 45, these jobs pay more than engineering positions (regardless of whether one’s degree comes from Canada or internationally).

### Key Observations: Canadian Degree Holders

While only 20 per cent of Canadian engineering degree holders work in non-engineering STEM positions, they tend to do well in this sector:

- **These positions are especially lucrative for graduates aged 25-34.**
  - » They deliver higher salaries than all other types of jobs for this age group.
- **This employment category has the largest income gap between men and women.**
  - » Across all age brackets, the gap ranges from 11 to 17 per cent.

*Note that incomes shown are only for engineering graduates in the 45-54 age range to provide a snapshot of engineering graduates in mid-career. Other age ranges will be presented in a full report at a later date.*





# Offer for engineers and engineering graduates

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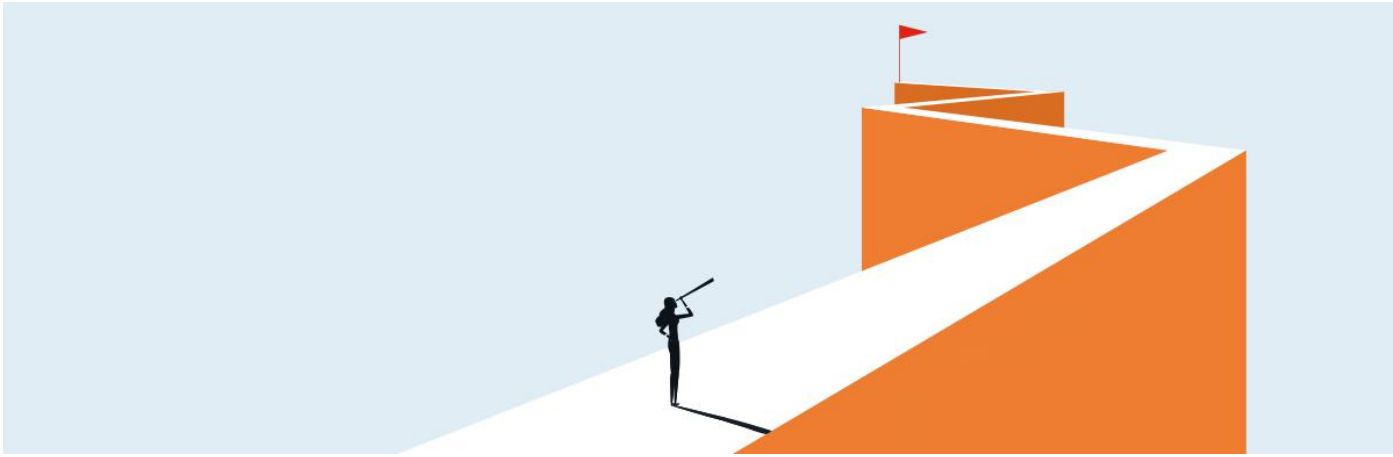
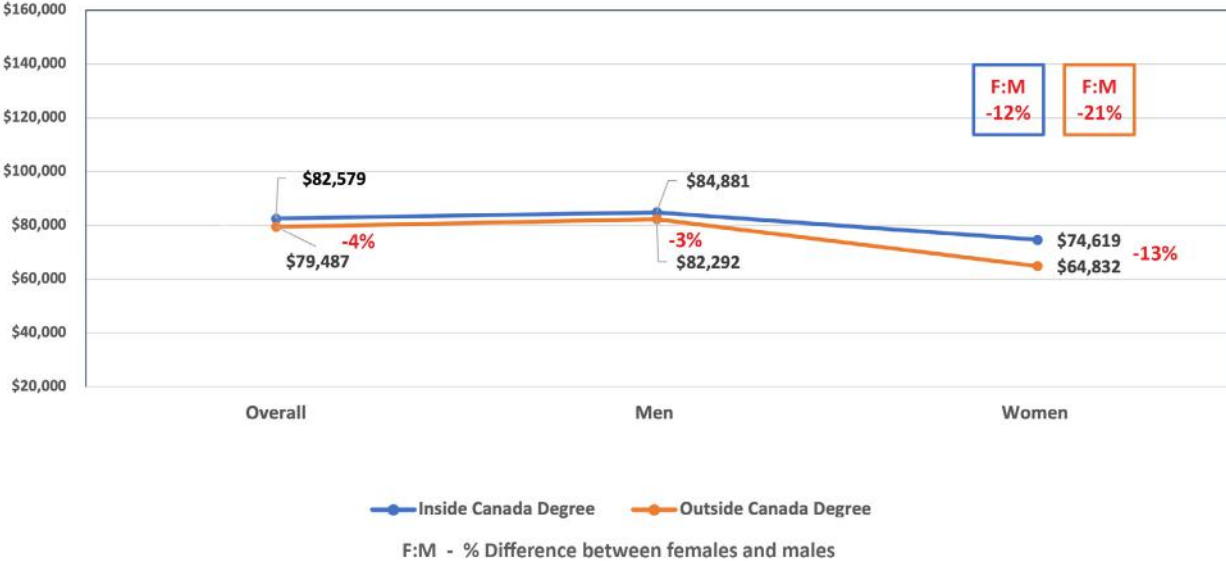
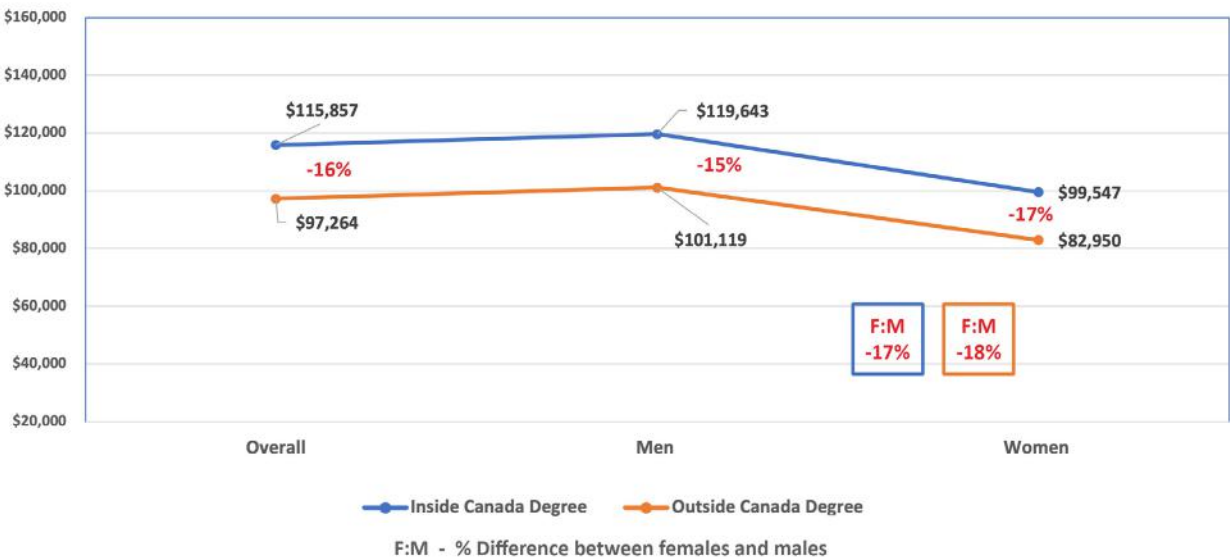


Figure 2: Income of Ontarians Working in Non-Engineering STEM Positions

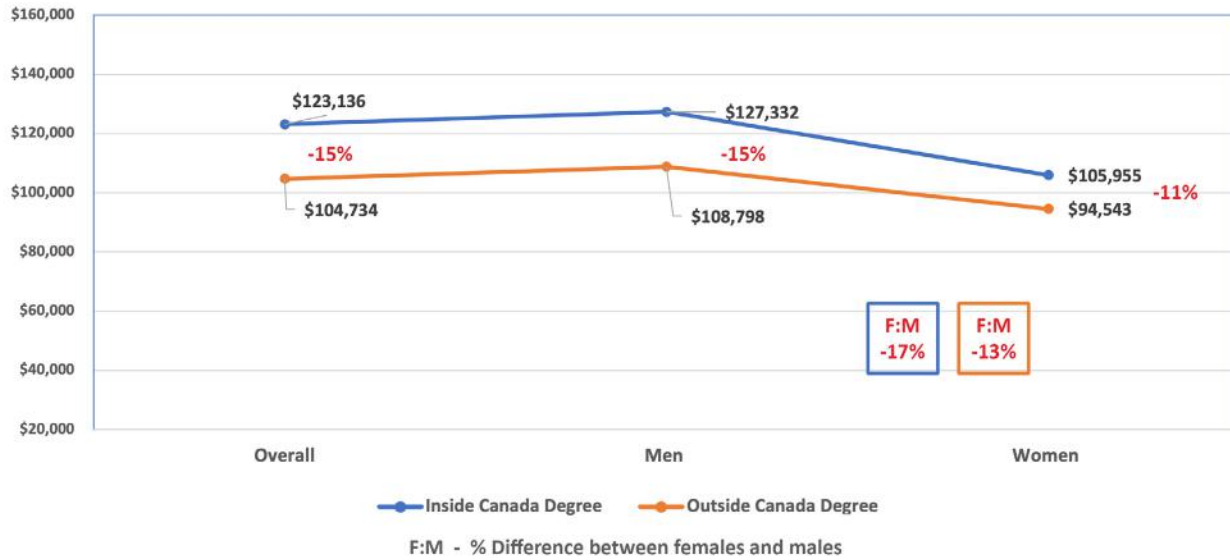
**Income in Ontario: Non-Engineering STEM, Ages 25 - 34**



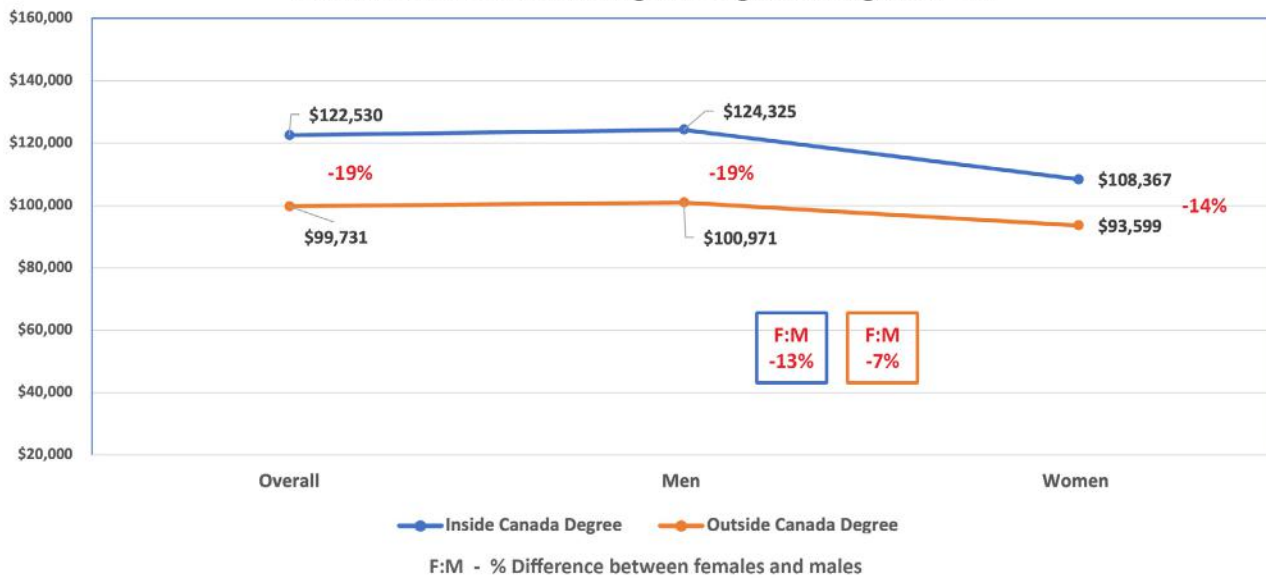
**Income in Ontario: Non-Engineering STEM, Ages 35 - 44**



### Income in Ontario: Non-Engineering STEM, Ages 45 - 54



### Income in Ontario: Non-Engineering STEM, Ages 55 - 64



Source: 2021 Canada Census

Figure 2 (pages 18-19) identifies income levels for engineering graduates working in non-engineering STEM positions across all age brackets. These graphs present the following data for each bracket:

- income gap between Canadian degree holders and International Engineering Graduates
- weighted median income of individuals in the same degree category (Canadian / International)
- income gap between women and men in the same degree category (Canadian / International)

Examples of specific jobs in this category (with accompanying income levels) are presented in Table 2 (page 21).

# Calling All OSPE Members!



Join Us at the General Assembly of Members. Don't miss this opportunity to be an active participant in OSPE's mission. Together, we'll shape the future of engineering in Ontario.



Thursday, November 2, 2023



11 am



**Engineering Conference**  
*OSPE Members must register in advance.*



## Why Attend?

**Have Your Voice Heard:** Your insights and ideas shape our organization's future. This is your platform to share your thoughts, concerns, and vision for OSPE.

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**Connect with Other Members:** This is a members only forum. A chance to engage other professionals on the issues that matter.

Your involvement is crucial, and we can't wait to see you there. Let's make a difference, together!

Questions? Contact us at [advocacy@ospe.on.ca](mailto:advocacy@ospe.on.ca) for more information.

**Table 2: Median Salaries of 45-54 Year Old Engineering Graduates Working in Non-Engineering STEM Positions (Ontario)**

TYPE OF POSITION	MEN: CANADIAN DEGREE	MEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)	WOMEN: CANADIAN DEGREE	WOMEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)
Computer and information systems managers	\$160,000	\$132,000	-18%	\$126,000	\$112,000	-11%
Information systems specialists	\$120,000	\$100,000	-17%	\$113,000	\$90,000	-20%
Software engineers and designers	\$133,000	\$120,000	-10%	\$120,000	\$104,000	-13%
Software developers and programmers	\$120,000	\$100,000	-17%	\$95,000	\$93,000	-2%

Source: 2021 Canada Census

Indeed, the jobs in this table are all considered “high-income,” even though IEGs are paid less than Canadian degree holders for the same work. One positive observation is that women software developers and programmers make similar wages regardless of whether their degrees come from inside or outside Canada.

## INCOME IN ONTARIO: ENGINEERING GRADUATES IN OTHER PROFESSIONAL ROLES

Jobs in this non-STEM category (such as roles in educational services, business, and advertising) normally require a university degree, and an engineering degree is viewed favourably. There are few generalizations that can be made about Canadian and International Engineering Graduates for this job type. However, two things are clear: those aged 35+ are generally well-compensated, and there are significant gaps in income depending on where an engineering graduate obtained their degree (Figure 3 - pages 23-24).

### Key Observations: Canadian Degree Holders

- **Canadian engineering graduates who work in this category command the highest salaries of any employment type—for men.**
  - » If money is the primary motivator, young men with Canadian degrees may want to start their career in these professions, as Census data suggest salaries are very high after age 35.
- **Although salaries for younger people in this category are lower than those for engineering or other STEM jobs (around \$62,000), salaries surprisingly almost double to \$118,000 by age 35+.**
  - » By age 55+, men in this category command over \$150,000 annually.
- **Disturbingly, women aged 55-64 earn almost 30 per cent less in these positions.**
  - » Across all age ranges, women in these positions earn at least 17 per cent less than their male counterparts.

## CLIMATE CRISIS TASK FORCE

Climate change is the most critical issue facing society today. OSPE's **Climate Crisis Task Force** is dedicated to making sure that engineers lead the way to a greener future.

This group is looking for volunteers who can make a difference by...

- Critiquing government policy
- Advocating for innovative climate solutions
- Educating key stakeholders

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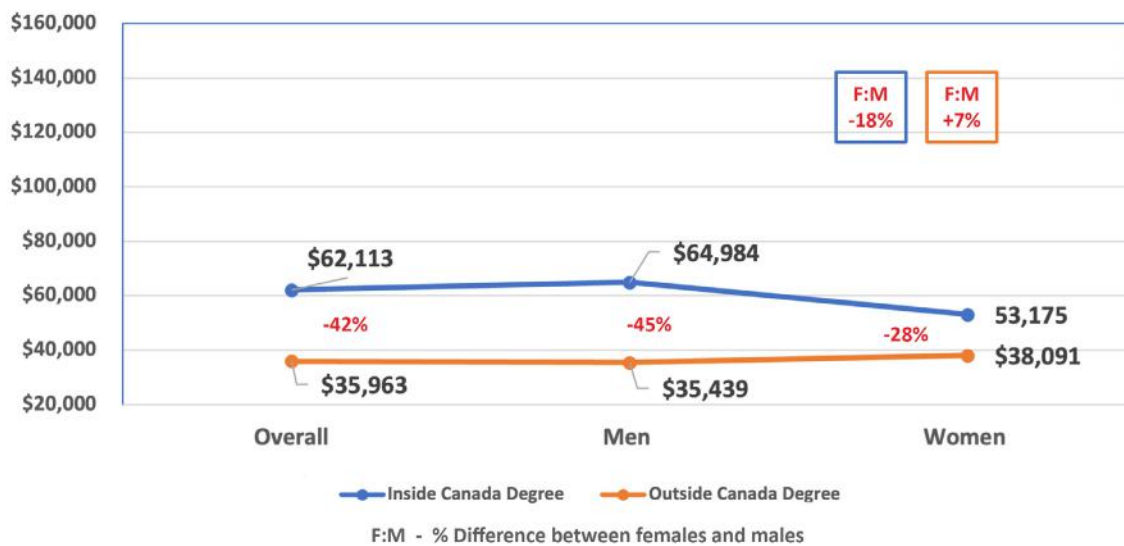
### Key Observations: International Engineering Graduates

Figure 3 (below) highlights the significant pay gaps between Canadian and International Engineering Graduates working in this category.

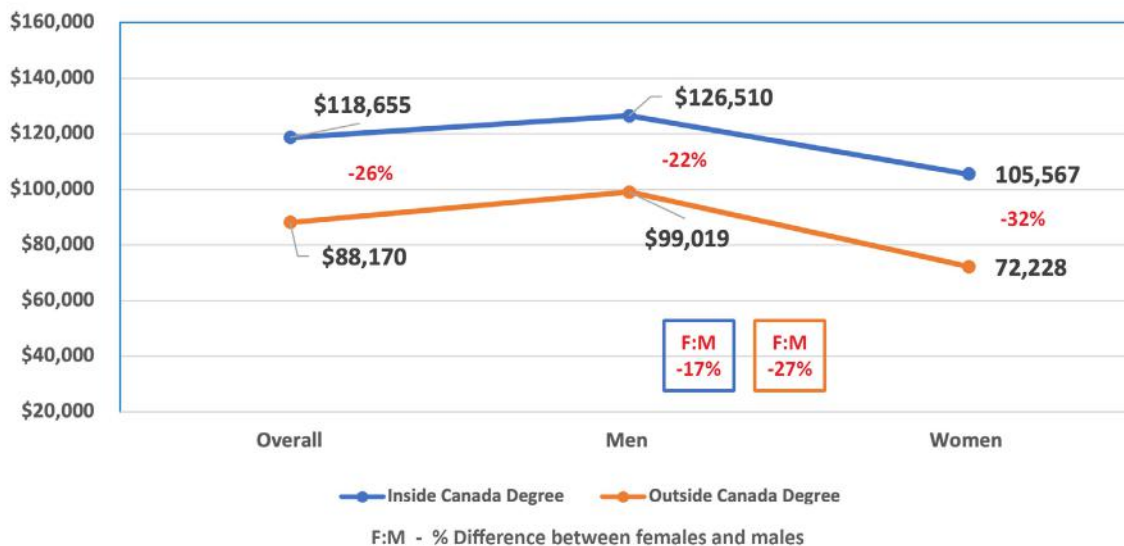
- Income gaps are glaringly wide—up to 45 per cent.
  - » Although only 10 per cent of International Engineering Graduates work in this category, they are clearly paid less than their Canadian counterparts.
- The largest gaps affect those in older age brackets, particularly those aged 55+.
  - » For both men and women IEGs aged 55+, salaries actually go down from the prior age range.

Figure 3: Income of Ontarians Working in Other Professional Roles

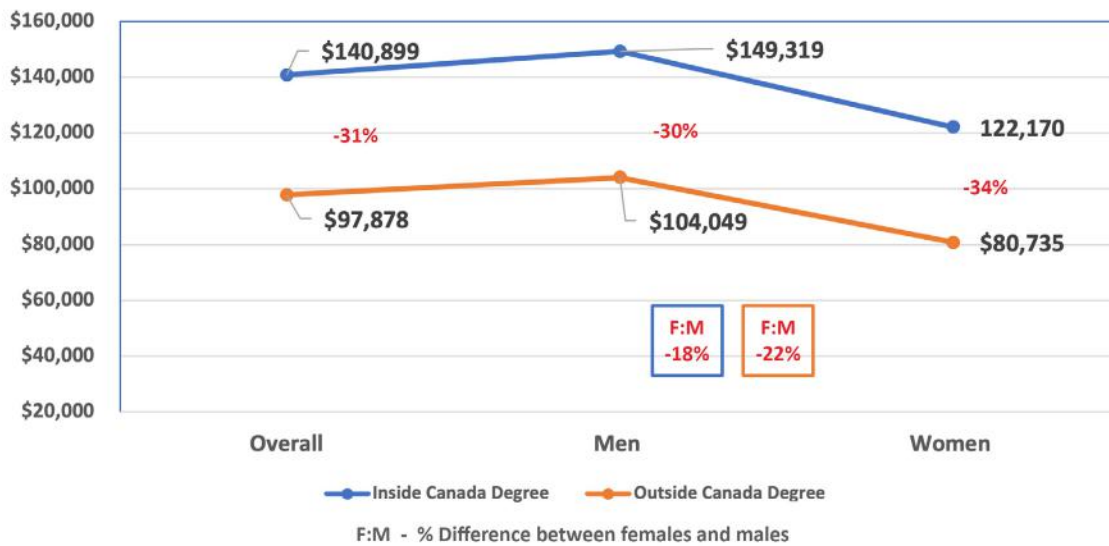
#### Income in Ontario: Other Professionals, Ages 25 - 34



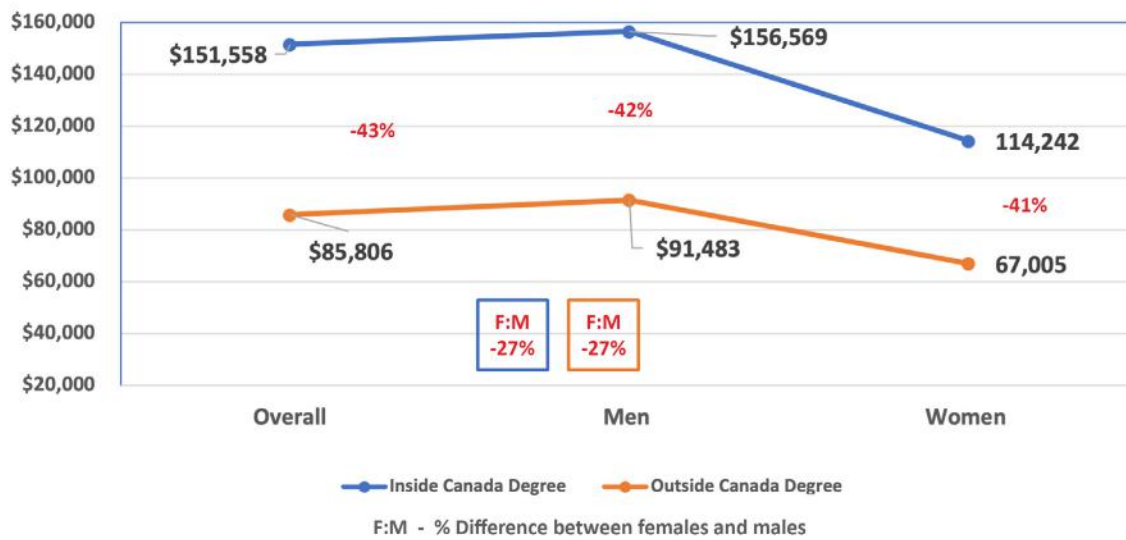
#### Income in Ontario: Other Professionals, Ages 35 - 44



**Income in Ontario: Other Professionals, Ages 45 - 54**



**Income in Ontario: Other Professionals, Ages 55 - 64**



Source: 2021 Canada Census

Figure 3 (pages 23-24) identifies income levels for engineering graduates working in other professional roles across all age brackets. These graphs present the following data for each bracket:

- income gap between Canadian degree holders and International Engineering Graduates
- weighted median income of individuals in the same degree category (Canadian / International)
- income gap between women and men in the same degree category (Canadian / International)



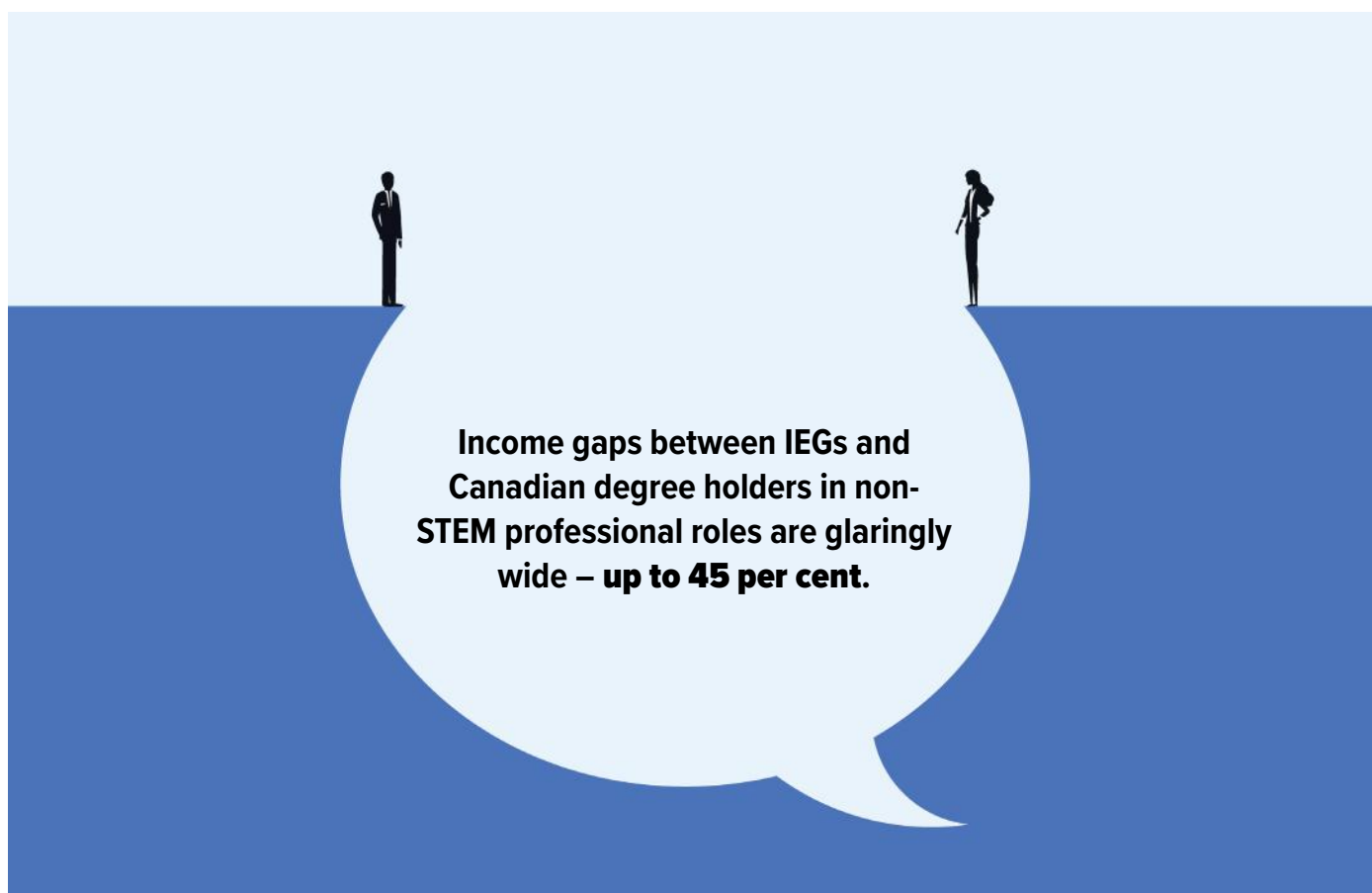
Table 3 (below) further identifies the income gap between Canadian and International Engineering Graduates.

**Table 3: Median Salaries of 45-54 Year Old Engineering Graduates Working in Other Professional Roles (Ontario)**

TYPE OF POSITION	MEN: CANADIAN DEGREE	MEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)	WOMEN: CANADIAN DEGREE	WOMEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)
Advertising, marketing and public relations managers	\$135,000	\$103,000	-24%	\$150,000	\$88,000	-41%
Professional occupations in business management consulting	\$111,000	\$88,000	-21%	\$120,000	\$89,000	-26%
Auditors, accountants and investment professionals	\$101,000	\$62,800	-38%	\$99,000	\$79,500	-20%
Professional occupations in education services	\$115,000	\$119,000	3%	\$102,000	\$48,400	-53%

Source: 2021 Canada Census

There is a sizeable income gap between IEGs and Canadian degree holders working in various sectors. For instance: internationally-trained men working in Business, Finance, and Administration make 38 per cent less than their Canadian counterparts. Likewise, internationally-trained women in this sector earn 20 per cent less than Canadian-educated women. It is possible that IEGs in this sector (and others) are being taken advantage of.



# What Does the Future Hold for Engineering in Ontario?

The answers might surprise you.

“There are clearly systemic barriers limiting women’s participation in the field.”

“I work in a contract teaching role, and that’s why I have my P.Eng....but if not for that, I probably wouldn’t have it.”

“International Engineering Graduates are passionate and enthusiastic, but barriers to employment may limit their ability to contribute.”



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ONTARIO  
SOCIETY OF  
PROFESSIONAL  
ENGINEERS

## INCOME IN ONTARIO: UNDEREMPLOYED ENGINEERING GRADUATES

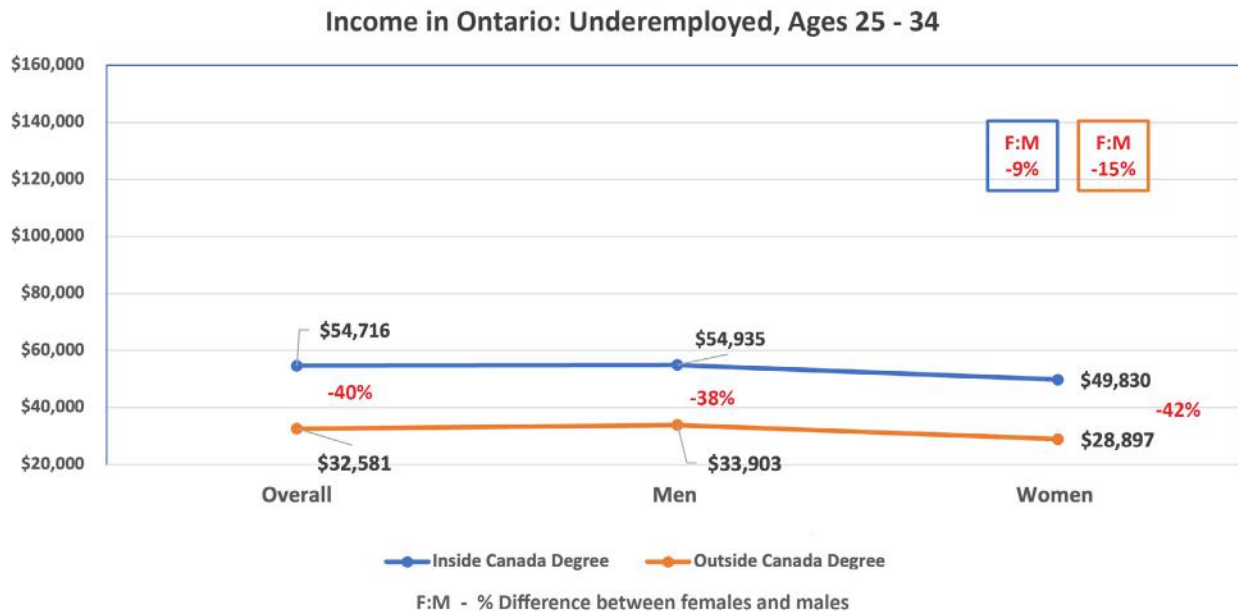
While jobs in this category do not necessarily require a university degree, that doesn't automatically mean that they aren't bona-fide careers. Indeed, Figure 4 (below) shows that men with Canadian engineering degrees can earn high salaries in many of these jobs. The figures also show that, no matter where they obtained their degree, women in this field have consistently lower pay than their male counterparts.

### Key Observations: Canadian Degree Holders

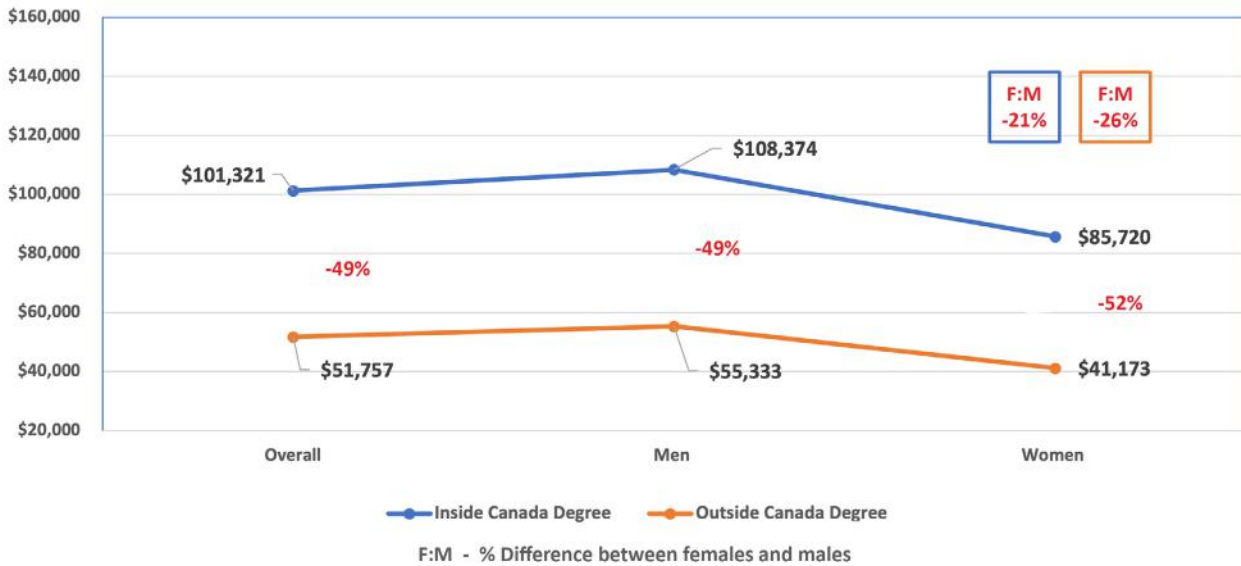
- **At 25 per cent, underemployment is the second most common category for engineering graduates with Canadian degrees.**
  - » The Census does not measure the reasons why engineering graduates work in these jobs, so we cannot determine if they choose these professions or are unable to find work in other sectors.
- **Younger people in this employment category earn lower wages than workers in other categories. But for men aged 35-44, median salaries double to over \$100,000.**
  - » In fact, underemployed men with Canadian degrees have annual salaries near or above \$100,000 right up to age 64.
- **Women in this category have much lower salaries from age 35 onward—the lowest of any job type.**
  - » By age 55, these women are making 28 per cent less than their male counterparts.

Table 4 (page 29) identifies several positions that command high salaries for men with Canadian engineering degrees. Management jobs in the utility and construction industries pay very well, and an engineering degree is likely useful in these positions. However, these jobs do not necessarily require a degree.

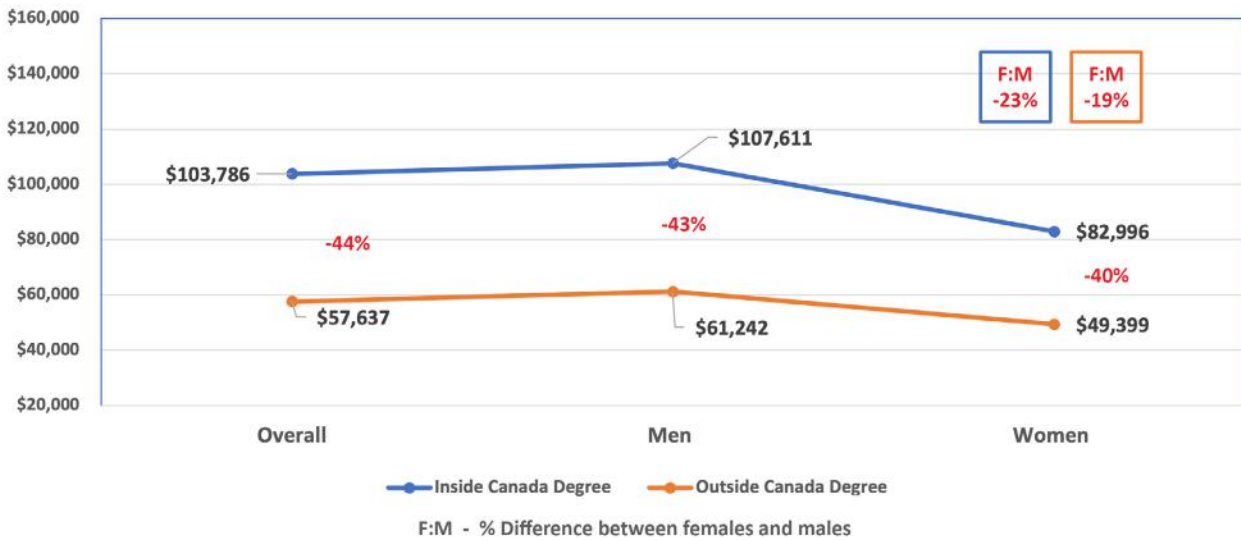
Figure 4: Income of Underemployed Ontarians



### Income in Ontario: Underemployed, Ages 35 - 44



### Income in Ontario: Underemployed, Ages 45 - 54



### Income in Ontario: Underemployed, Ages 55 - 64

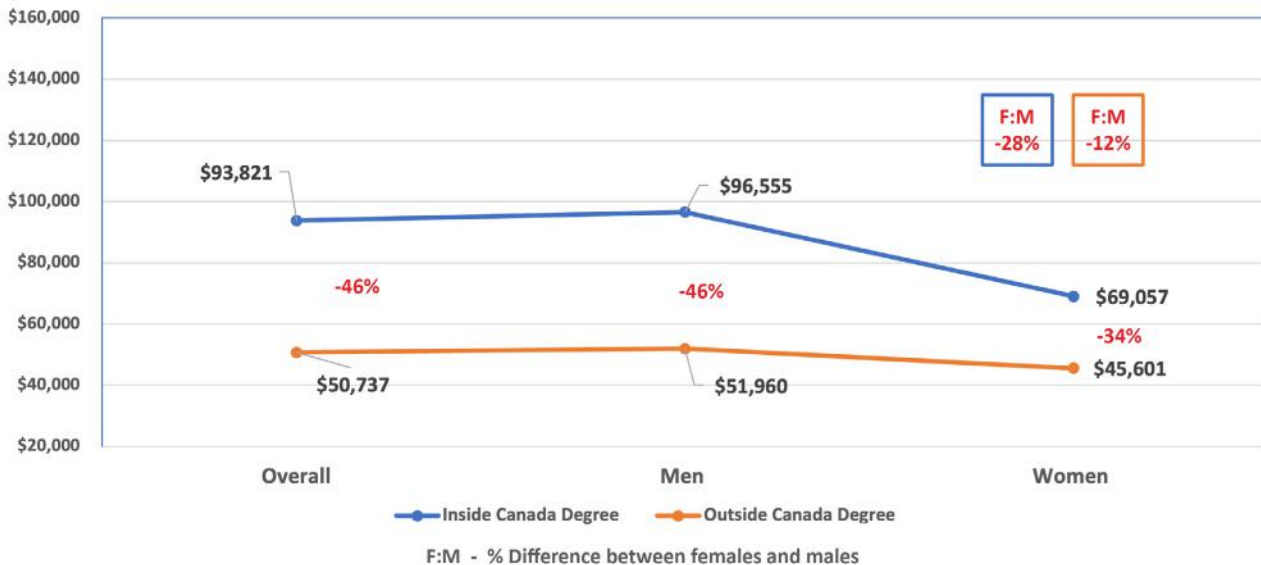


Figure 4 (pages 27-28) identifies income levels for “underemployed” engineering graduates across all age brackets. These graphs present the following data for each bracket:

- income gap between Canadian degree holders and International Engineering Graduates
- weighted median income of individuals in the same degree category (Canadian / International)
- income gap between women and men in the same degree category (Canadian / International)

### Key Observations: International Engineering Graduates

- Almost half (49 per cent) of International Engineering Graduates are underemployed, and their salaries are much lower than those of Canadian degree holders.
- Many of these are ‘survival’ jobs simply to make ends meet. These include sales and service positions such as cashiers, and machine operators/assemblers.
- IEGs in this category make around 50 percent less than Canadian degree holders.
- The gaps are glaringly large, ranging up to 49 per cent less pay for IEG men and 52 per cent for IEG women in the 35-44 age bracket. It is a strong possibility that these individuals did not choose to work in survival jobs; rather, they were borne out of necessity to support themselves and their families.
- Interestingly, IEG women with middle management positions in retail, trade, and customer services make more money than IEG men working the same positions.
- Regardless, though, all these people have engineering degrees—and certainly, this education does not prepare them for sales and service roles. And the income gap between Canadian and International Engineering Graduates in this category is extreme; IEG men make 64 per cent less than Canadian degree holders.

Table 4 shows specific jobs and the income dichotomy between Canadian and International Engineering Graduates. Even if some positions pay international degree holders quite well (over \$100,000), they still make significantly less than their Canadian counterparts. Clearly there is discrimination (and possibly exploitation) of these workers.

**Table 4: Median Salaries of 45-54 Year Old “Underemployed” Engineering Graduates (Ontario)**

TYPE OF POSITION	MEN: CANADIAN DEGREE	MEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)	WOMEN: CANADIAN DEGREE	WOMEN: INTERNATIONAL DEGREE	% DIFFERENCE (INTERNATIONAL: CANADIAN)
Technical occupations related to natural and applied sciences	\$91,000	\$76,500	-16%	\$79,500	\$70,500	-11%
Middle management occupations in retail and wholesale trade and customer services	\$137,000	\$50,000	-64%	\$85,000	\$56,000	-34%
Technical occupations in the arts, culture and sports	\$139,000	\$97,000	-30%	\$115,000	\$83,000	-28%
Managers in manufacturing and utilities	\$155,000	\$111,000	-28%	\$202,000	\$97,000	-52%

Source: 2021 Canada Census

## CONCLUSION

The good news for men is that those with Canadian engineering degrees are making a decent living, no matter what type of job they make as their career. Women with engineering degrees from inside Canada—especially those working in engineering—are also making very good wages. (They fare quite well in other types of jobs as well.)

What is disturbing is that no matter what job they have, women are making less than their male counterparts. The gaps are relatively narrow for those working in engineering, but are certainly wider in other professions. Census results show gender indeed does make a difference in what engineering graduates make.

The obvious bad news is for those with degrees from outside Canada. Except for non-engineering STEM jobs, International Engineering Graduates make significantly less than those with degrees from inside Canada.

OSPE knows many immigrants to Canada who have become disheartened at the difficulty in securing decent jobs. They migrate to Canada under the impression they will not have a problem finding work in engineering; but as we see by the Census, half of them end up underemployed in low-paying jobs that do not necessarily require a degree.

With provincial government funding, OSPE has trained many International Engineering Graduates with job search skills and career counselling. At the end of the most recent project, over 80 per cent of participants were employed. OSPE hopes more funding will become available through the government's Bridge Training Programs for internationally trained immigrants, as the need is great.



### EQUITY, DIVERSITY, INCLUSION & ACCESSIBILITY TASK FORCE

We live in a world where everyone should be able to make their contribution. OSPE's **EDIA Task Force** is actively promoting inclusion and supporting those organizations committed to real change.

This critical group ensures that OSPE considers EDIA in all aspects of its operations and policy by...

- Identifying areas for improvement
- Engaging like-minded organizations and sharing resources
- Fostering allyship amongst OSPE members and other key

Interested in building an inclusive engineering community?  
Contact [advocacy@ospe.on.ca](mailto:advocacy@ospe.on.ca)



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**September 21**

**Project Management for Engineers**  
with Darya Duma, P.Eng., PMP

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| <b>October 5</b>    | Cyber-Physical Security During the Rise of the Machines                          |
| <b>October 12</b>   | Understanding the Challenges Facing the Ontario Electrical System                |
| <b>October 19</b>   | Risk-Based Infrastructure Planning   |
| <b>October 26</b>   | Engineering Designs and Chemical Safety: A Vital Duty for Professional Engineers |
| <b>November 16</b>  | Permeable Pavements Using Recycled Rubber  |

*Do you have expertise to share with the OSPE community?  
Let us know: [pd@ospe.on.ca](mailto:pd@ospe.on.ca)*



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*\*CPD requirements are set by Professional Engineers Ontario. Based on our understanding of those requirements, OSPE offers a number of activities and courses designed to help the engineering community meet those standards. However, PEO does not endorse or validate any providers at this time. Further, all participants in OSPE programs should consider the requirements of their discipline/practice area in managing their individual CPD strategies.*

# Minimizing Home and Building Emissions: The Role of Deep Energy Retrofits

Pauline Watson, P.Eng. (OSPE Sustainable Cities Task Force)



Canada has agreed to various GHG emissions reduction targets over the years, with our current federal target being a 40 per cent reduction from 2005 emissions by 2030 and net zero by 2050. Despite government efforts, we are not on a path to achieving this target – but transformational policy and financial solutions can help get us there.

Specifically, there is an opportunity to cut emissions by incentivizing deep energy retrofits. A deep energy retrofit is a whole building analysis and construction process that aims to minimize a building's on-site energy use by 50 per cent or more (compared to baseline energy use), making use of existing technologies, materials, and construction practices. A deep energy retrofit should reduce the amount of energy used, and replace carbon-

based energy sources (such as oil and natural gas) with clean low-carbon energy sources. Deep energy retrofits can adopt technologies from net-zero energy designs, which are technically feasible but not yet scalable or affordable for the average home buyer.

Home and building space and hot water heating accounts for roughly one third of Ontario's greenhouse gas (GHG) emissions. With aggressive, innovative action to promote deep energy retrofits, the government can support a major emissions reduction. Cutting GHG emissions from homes and buildings requires two approaches: reducing home heat loss and transitioning to clean energy sources for heating.



## REDUCING HOME HEAT LOSS

There are proven and effective ways to reduce home heat losses through retrofits:

- Renovating homes to reduce heat lost through the building envelope (windows and doors, basements, roofs, and walls). Windows should be at least double glazed (preferably triple), and insulation should be to R2000 standards.
- Recovering heat from wastewater and exhausted air through heat recovery ventilators.
- Using tankless hot water heaters to eliminate the heat loss from hot water tanks.
- Smart Thermostats reduce energy needs (both for heating and cooling) by controlling the building temperature in occupied rooms only, and reducing the heating and cooling needs when the building is unoccupied.

Figure 1 shows how minimizing heat loss can reduce energy usage from the typical 120GJ/y<sup>1</sup> to about 104 GJ/y.

<sup>1</sup>Statistics Canada. [Table 25-10-0061-01 Household energy consumption, by type of dwelling, Canada and provinces](#)

## FUELLING HOMES WITH CLEAN ENERGY

After home heating losses have been reduced as much as possible, there is an opportunity to use cleaner energy sources for home heating. About 75 per cent of existing homes and buildings in Ontario use natural gas (or other fossil fuels) for space and water heating. Heating homes and buildings with electricity instead would significantly reduce our GHG emissions, because the Ontario grid provides relatively clean electricity, thanks to a large supply of nuclear and hydroelectric energy.



## SUSTAINABLE CITIES TASK FORCE

Ontario's urban areas are central to our vibrant economy and diverse community. The **Sustainable Cities Task Force** is focused on the future development and redevelopment of these areas in smart, sustainable ways.

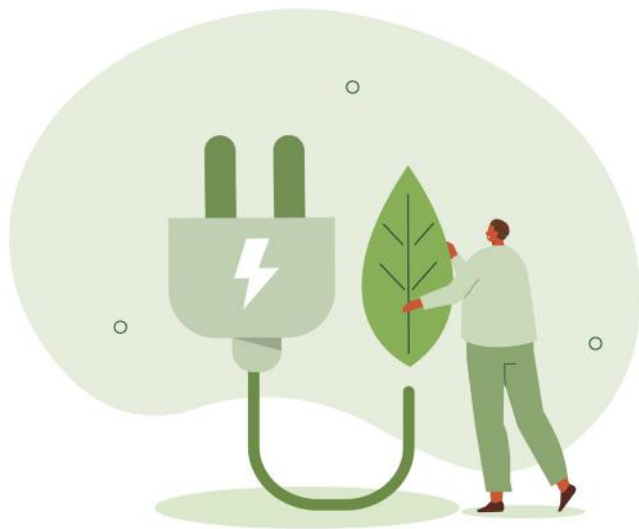
Help this team ensure urban development follows the right path by...

- Recommending improvements and retrofits
- Engaging the government in proper planning
- Sharing feedback on new policies and programs

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The natural gas used for home heating can also be replaced with clean, affordable thermal energy. These include heat pumps (ground or air source), solar thermal, and district energy generated by clean sources such as waste heat recovery or geothermal. Hydrogen is also becoming a feasible non-fossil source of heat.

To achieve the 50 per cent reduction in energy use (deep energy retrofit), the required technologies are currently quite expensive. The typical home uses about 100 GJ of energy for heating per year, and reducing this by 50 per cent (50GJ/y), or ideally to near zero, would require an investment upwards of \$40k (Figure 2). The current federal government offers a subsidy of only \$5k; so understandably, these renovations are uncommon. Financing to encourage these improvements (such as interest free loans or local improvement charges) could be effective, and not inconsistent with government philosophy.



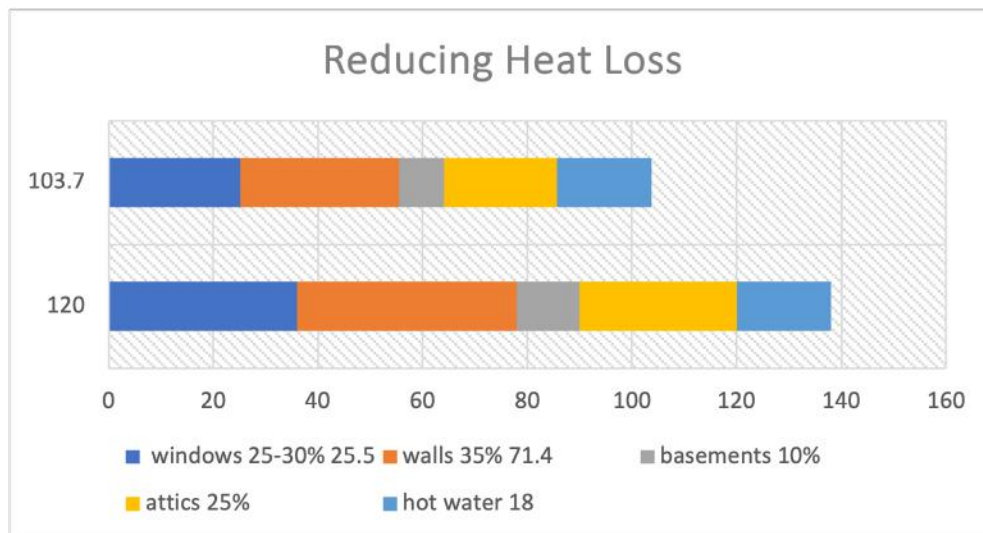
## LOOKING FORWARD

Amidst Ontario's ongoing housing shortage, there is a need and opportunity to make homes across the province more energy-efficient. The provincial government plans to increase housing supply, and the 1.5 million homes they are promising must be as energy-efficient as possible.

For existing homes, there is an opportunity to implement energy efficiency requirements for retrofits; the federal government is working on a code for retrofits for 2024. At the local and provincial levels, significant financial incentives (such as grants or low interest loans) are needed to incentivize deep energy retrofits that will reduce GHG emissions from homes and buildings.

Whatever the strategy, it is clear that urgent action is needed to reduce emissions from homes and buildings. Previous provincial governments had significant GHG emissions reduction policies (including shutting down coal-fired electricity plants, implementing a Feed-in-Tariff program to encourage green energy, and subsidizing electric vehicle purchases). Unfortunately, the current government cancelled many green energy initiatives and abolished the environment commissioner position, which held the province accountable for GHG emission reductions. Preventing climate change is widely recognized as an emergency and should be treated as a non-partisan issue; we cannot afford to stop-start these initiatives whenever there is a change in government.

Figure 1



**Figure 2**  
**Cost Effectiveness of Retrofit Technologies**  
 (Assuming 102 GJ/y space heating and 18GJ/y hot water for a typical household)

Technology	Heat Loss (typical)	Approximate Energy savings GJ/y with best technology	Approximate Cost – including installation, k\$
<b>REDUCE ENERGY LOSS</b>			
Space Heating – 102 GJ/y			
Windows	20-25%	High efficiency windows save 30-35% heat loss or 7-15 GJ/y	11-22 for 15 windows
Insulation (walls, basement, roof)	70%	R2000 insulation save 28% heat loss or 20 GJ/y	5-20
		Heat Recovery Ventilator save 25GJ/y	2-5
Hot Water – 18 GJ/y			
Drain Water Heat Recovery		Save 20-30% or 8-9GJ/y	0.3-0.5
Tankless Hot Water		Save 30%	
<b>GREEN ENERGY</b>			
Ground Source Heat Pump		100 GJ/y	15-35
Air Source Heat Pump		40 GJ/y	6 - 15
Tankless Hot Water - Electricity			1.2-3.5
Solar Hot Water		12-18 GJ/y	4-9

## SOURCES:

### Windows

Natural Resources Canada. Improving Window Energy Efficiency. ([https://natural-resources.canada.ca/sites/nrcan/files/energy/pdf/energystar/IWEE\\_EN.pdf](https://natural-resources.canada.ca/sites/nrcan/files/energy/pdf/energystar/IWEE_EN.pdf))

Natural Resources Canada. Energy Efficiency - Energy Efficiency for Products – Windows, Doors and Skylights (<https://natural-resources.canada.ca/energy-efficiency/products/windows-doors-and-skylights/13739>)

### Insulation

Natural Resources Canada. Keeping The Heat In - Section 7: Insulating Walls: insulating, renovating and building additions (<https://natural-resources.canada.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/chapter-7-insulating-walls/15641>)

Natural Resources Canada. Keeping The Heat In – Section 6: Basement insulation: floors, walls and crawl spaces (<https://natural-resources.canada.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/section-6-basement-insulation-floors-walls-and-crawl-spaces/15639>)

Natural Resources Canada. Keeping The Heat In – Section 5: Roofs and attics (<https://natural-resources.canada.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/chapter-5-roofs-and-attics/15637>)

### Heat Recovery

Ecolnnovation. How Does Drain Water Heat Recovery Work? (<https://ecoinnovation.ca/en-ca/pages/homeowner>)

Wikipedia. Heat recovery ventilation. ([https://en.wikipedia.org/wiki/Heat\\_recovery\\_ventilation](https://en.wikipedia.org/wiki/Heat_recovery_ventilation))

Energy.gov. Drain-Water Heat Recovery. (<https://www.energy.gov/energysaver/drain-water-heat-recovery>)

### Heat Pumps

Natural Resources Canada. Heating and Cooling With a Heat Pump. (<https://natural-resources.canada.ca/energy-efficiency/energy-star-canada/about/energy-star-announcements/publications/heating-and-cooling-heat-pump/6817#a2>)

Furnaceprices.ca. Heat Pump Price Guide: How Much You'll Pay for a New Heat Pump Installed in Canada (<https://www.furnaceprices.ca/heat-pumps/heat-pump-prices/>)

### Solar Hot Water

Natural Resources Canada. Solar water heaters. (<https://natural-resources.canada.ca/energy-efficiency/products/water-heaters/solar/14562>)

### Tankless Hot Water

Natural Resources Canada. Tankless water heaters. (<https://natural-resources.canada.ca/energy-efficiency/products/water-heaters/tankless/14541>)

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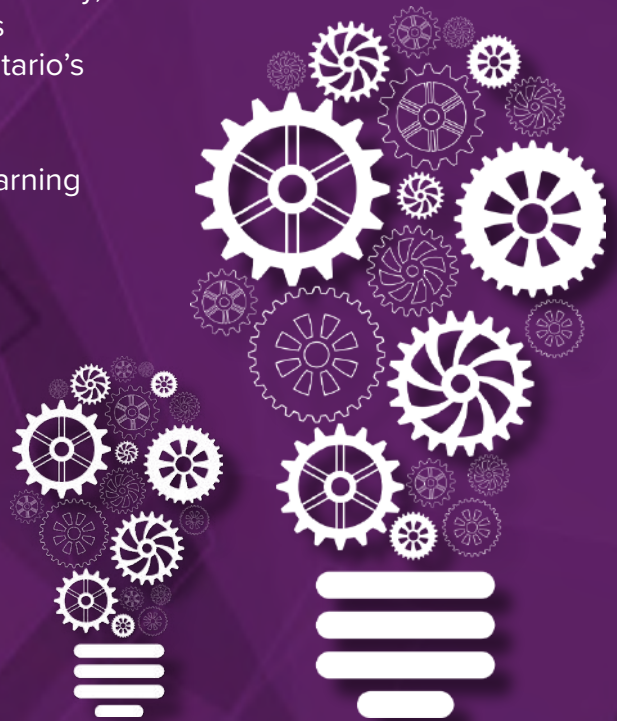
# THE ENGINEERING CONFERENCE

November 2, 2023 | Metro Toronto Convention Centre

The Engineering Conference gathers leading experts from industry, government, and academia to discuss the critical challenges facing our profession and our province, and identify how Ontario's engineers can respond.

The #EngCon programming lineup includes the following learning sessions, with more content still being added.

**All learning sessions can be counted towards continuing professional development requirements for engineers.**



## Tags:

**AI:** Expert insights on the development and implementation of Artificial Intelligence.

**Climate Crisis:** Discussing the urgent threat of climate change and how engineers can respond.

**EDI:** Making the engineering profession equitable, diverse, and inclusive.

**Energy:** The latest in electricity production and distribution.

**Engineering Profession:** Regulation, licensing, practice rights, and more.

**Innovation:** Cutting-edge research and development news from across Ontario.

**Sustainability:** Insights from the journey towards a cleaner, greener Ontario.

**Sustainable Cities:** Making new and existing infrastructure greener and more efficient.

## Artificial Intelligence for a Resilient Future: Using AI to Combat the Climate Crisis



*Michael Monette, P.Eng., MBA  
(Rinion Consulting Inc.)*

Artificial Intelligence (AI) has the potential to revolutionize how we approach the climate crisis, providing insights and solutions that can help us mitigate the impact of human activities on the planet. AI can help analyze large data sets related to weather patterns, air pollution, and other environmental factors. This analysis supports the design and deployment of renewable energy systems and identifies areas that are most vulnerable to the effects of climate change.

Panelists will explore the benefits and drawbacks of AI as a tool to mitigate the climate crisis, its potential to contribute to a resilient infrastructure system, and the challenges and risks associated with its deployment.

*Panelists for this session will soon be announced. Stay tuned to OSPE's digital channels for updates.*

Tags: [AI](#) | [Climate Crisis](#) | [Energy](#) | [Innovation](#) | [Sustainability](#) | Sustainable Cities

## AI-Fueled Innovation: The Next Frontier



*Dr. Alexander Wong, P.Eng.  
(University of Waterloo)*



*Sanjeev Gill  
(WatSPEED)*

In this fireside chat, AI expert Alexander Wong will explore how AI is enabling engineers to reimagine technology, supercharging the pace of innovation and enabling deployable, explainable, and impactful solutions. The conversation will cover critical topics, including the fundamentals of AI, its practical applications in engineering, and ethical considerations surrounding its use. The integration of AI with other emerging technologies, the technical challenges in AI development, and use cases specific to engineering will also be discussed. You will gain valuable insights and an understanding of the practical applications of AI that engineers need to know.

Tags: [AI](#) | [Innovation](#) | [Engineering Profession](#)

## Beyond Numbers: Measuring Authentic EDI Progress



*Cheryl Young  
(Enbridge Inc.)*



*Dr. Omar Badreldin  
(Northeastern University)*



*Michelle Folliott  
(Ontario Power Generation - OPG)*

Implementing initiatives and developing policies to build an equitable future is great, but how are the effects measured? Creating metrics and targets often leads to tokenism and disingenuous diversity efforts that don't make the impact they claim to.

In this discussion, panelists will engage in a guided conversation on how diversity and inclusion efforts are measured in their workplaces and how they arrived at these measurement strategies.

*Additional panelists for this session will soon be announced. Stay tuned to OSPE's digital channels for updates.*

Tags: [EDI](#) | [Engineering Profession](#)

## The Career Journey of the 21st Century Engineer



*Cindy Rottmann, P.Eng.  
(University of Toronto)*



*Emily Moore, P.Eng.  
(University of Toronto)*

A recent study by Troost ILead at the University of Toronto examined the career paths of engineers across Canada. The study found a broad range of careers beyond the "typical" engineering career path, and also provided valuable insights about equity, diversity, and inclusion across the various paths. This session features a panel discussion with engineers pursuing the five different career paths identified in the study (technical specialist, managerial, interdepartmental integrator, entrepreneur, and engineers in non-traditional industries).

It will explore workplace realities, leadership opportunities, and implications for engineering education, professional development, and certification.

Tags: [EDI](#) | [Engineering Profession](#)



## Driving Transformation: Leading the Way in EDI Change



*Katy Kwong, B.A.Sc., P.M.P.  
(Canadian Tire Corporation)*



*Stephanie Bleker, P.Eng.  
(Vale)*

Equity, diversity and inclusion encompasses a broad range of topics with endless opportunities to effect meaningful change. Companies of all sizes are implementing initiatives to create inclusive cultures and equitable business models.

On this panel, industry leaders will discuss how moving the needle in a company requires a top-down approach. Panelists will have the opportunity to share how their leadership is disrupting the status quo, the opportunities they are creating for equity-seeking groups, and how this has impacted their overall business model.

*Additional panelists for this session will soon be announced. Stay tuned to OSPE's digital channels for updates.*

Tags: **EDI** | **Engineering Profession**

## Engineering and the SDGs: Are We On Track?



*Brian Harrigan, P.Eng., MBA  
(Engineers Without Borders)*

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The creativity, know-how, technology, and financial resources from all of society - engineers included - are necessary to achieve the SDGs. This session will explore how engineers have contributed to achieving the SDGs, how realistic the goals are today, and how we can measure success.

Tags: **Climate Crisis** | **Engineering Profession** | **Sustainability**

## Engineers' Ethical, Professional, and Human Rights Obligations as Technology Creators



*Michelle Liu, P.Eng., Ph.D. Candidate  
(OSPE EDIA Task Force)*

Observers around the world have identified ethical issues with emerging technologies, such as algorithmic bias in AI surveillance software. But less attention has been paid to potential inequities present in fundamental forms of technology, including our physical infrastructure. This session will encourage engineers from all disciplines to consider their ethical, professional, and human rights obligations. The presentation will describe these obligations, identify their sources in Ontario, and explore inequities that can arise from failure to meet these obligations. Guests will understand how meeting these obligations can help reduce bias and inequity in the technology that engineers create.

Tags: [EDI](#) | [Engineering Profession](#) | [Innovation](#)

## Evolving Climate-Ready Resiliency in the Energy Sector



*Asta Wallace  
(Ontario Power  
Generation)*



*Erin Jaggard  
(Hydro One)*



*Kadra Branker  
(Independent Electricity  
System Operator)*



*Sushma Narisetty,  
P.Eng.  
(Toronto Hydro)*

Ontario is at a crossroads in our fight to mitigate the impacts of the climate crisis. Achieving net-zero goals in diverse economic sectors depends on reliable, affordable net-zero energy. This panel outlines the challenges and opportunities of building a net-zero Ontario. It will cover the current climate crisis and its impact on the energy sector, review existing plans, explore the expectations outlined in regulations, highlight what is missing, identify the skill sets needed to meet this challenge, and issue a call to action for engineers and other professionals.

Tags: [Climate Crisis](#) | [Energy](#) | [Sustainability](#) | [Sustainable Cities](#)

## Inside Brampton's Zero Energy Bio-Regenerative Food Shed



*Phil Fung, P.Eng.  
(SRS Consulting Engineers Inc.)*

This presentation will provide an inside look at the City of Brampton's zero energy bio-regenerative Food Shed, an innovative container farm that combines cutting-edge engineering design with organic vertical agricultural methods to provide food sovereignty – food security, safety, and diversity – to communities. The Food Shed contains its own ecosystems (energy, food, and waste), and uses a combination of soil-based, hydroponics, and aquaponics growing systems to grow edible organic vegetables and edible fish. The shed is zero-waste, carbon-negative, powered by solar energy, and it is built to withstand harsh winters using passive house design methodology.

Tags: [Climate Crisis](#) | [Energy](#) | [Innovation](#) | [Sustainability](#) | [Sustainable Cities](#)

## Moving the Dial on Diversity & Inclusion in Engineering



*Jasmine Shaw,  
P.Eng., MASC  
(OSPE EDIA Task Force)*



*Kimberley Paradis  
(OSPE EDIA Task Force)*



*Michelle Liu, P.Eng.,  
Ph.D. Candidate  
(OSPE EDIA Task Force)*



*Shivani Nathoo,  
EIT, BASc  
(OSPE EDIA Task Force)*



*Tiffany Joseph,  
CAPM  
(OSPE EDIA Task Force)*

Equity, Diversity, and Inclusion (EDI) has been a priority in the corporate world for several years, with a particular focus on supporting women in engineering. However, progress has been slower than anticipated. One of the greatest challenges is bridging the gap between knowing “what to do” and “how to do it.” In this session, members of OSPE's EDIA Task Force will discuss the progress our profession has made on the EDI front, identify gaps that remain, and suggest pathways to progress. Panelists will also share their experiences as the next generation of women engineers and explore the barriers facing them and their colleagues. The panel will provide a fresh perspective on EDI that is accessible, engaging, and tangible, especially for engineers.

Tags: [EDI](#) | [Engineering Profession](#)

## The New Data Economy: Innovation & Governance



*Beatrice Sze, P.Eng., J.D.  
(OSPE Research & Innovation  
Task Force)*



*Chloe Richard, BEng  
(OSPE Cleantech Working  
Group)*



*Ryder Leblanc, MEng  
(OSPE Data Working Group)*

Innovation is occurring faster than regulation in the new data economy; therefore, data practitioners like engineers have an opportunity to lead the discussion on what responsible data governance means. This presentation will gather artificial intelligence, cybersecurity, and data ethics practitioners for a discussion on the future of the engineering profession in this space, including opportunities to be seized and risks to be managed. This informed discussion between experts will equip policy makers and business leaders to understand the key tech principles that inform policy decisions in this space.

Tags: [AI](#) | [Engineering Profession](#) | [Innovation](#)

## Ontario's Energy Transition: The Electricity Sector's Role in a Sustainable Future



*Robby Sohi, P.Eng.  
(IESO)*

This is a pivotal time in the energy sector; the electricity system will play a key role in supporting Ontario's net-zero goals. This session will provide an overview of Ontario's electricity sector, how it will evolve to support the energy transition, and the role of engineers in this process. With one of the cleanest energy supply mixes in North America, Ontario has an advantage that will help drive broad emission reductions in the system, as other sectors of the economy decarbonize. Collaboration and action will be fundamental to our success in working towards a more sustainable future.

Tags: [Climate Crisis](#) | [Energy](#) | [Sustainability](#) | [Sustainable Cities](#)

## Nature-Based Solutions for City Resilience: The Global Sponge Cities Snapshot



*Charles Ormsby, P.Eng.  
(Arup Consulting)*



*Nick Copeland, P.Eng., C.Eng., MICE  
(Arup Consulting)*

Arup's Sponge City analyses have provided unprecedented data to help cities assess their "sponginess" and prepare for flood events and climate change. The initial snapshot analyzed eight major cities across the globe, and successive analyses have examined major African cities and Montreal (the snapshot's northernmost city). This presentation will highlight which cities are among the world's most "sponge-like," with the ability to absorb rainfall and mitigate the type of flooding that has become more common with climate change. Comparing Montreal (and potentially Toronto) with other cities around the world, this presentation will draw out overall themes, lessons learned for cold climates, and the need for action to improve stormwater management, biodiversity, and human wellbeing.

Tags: [Climate Crisis](#) | [Sustainability](#) | Sustainable Cities

### *Hear from the Speaker – Nick Copeland, P.Eng., C.Eng., MICE*

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In Toronto, we host one of the largest ravine networks in the world, which significantly contributes to our "sponginess" ranking. Although Toronto's ravine system plays a significant role in accommodating the city's stormwater, densification, climate change, and extreme rainfall events will place increasing pressures on these natural features. A proactive and strategic approach is needed to capitalize on this rapid pace of development to steer our city in a more nature-centric direction.

The data also shows that Toronto's historical divides have led to pockets of significantly lower green areas in certain neighbourhoods, reducing overall sponginess. Nature-based solutions throughout these areas could improve equity and give more residents access to urban green spaces which are shown to improve wellbeing and provide other co-benefits (such as cleaning the air and reducing the urban heat island effect).

This session will include a presentation followed by a short, hands-on design charette discussing how cities like Toronto could become more "sponge like." The speakers will compare Toronto with other major global cities, present lessons learned for green infrastructure for cold climates, and lay out a call for action to improve stormwater management, biodiversity, and human wellbeing.

## Net-Zero 2035: The Impact of Supply Mix Choices on Ontario's Electricity Grid



*Paul Acchione, P.Eng., FCAE  
(MIDAC)*

This presentation will explore several electricity system supply mix options to achieve net-zero emissions by 2035 without compromising reliability and resiliency. It will also present the forecasted electricity prices, the amount of surplus zero-emission electricity that will be curtailed (unused), and the amount of nameplate capacity overbuild that will result from each supply mix choice.

Tags: [Climate Crisis](#) | [Energy](#) | [Sustainability](#) | Sustainable Cities

### *Hear from the Speaker – Paul Acchione, P.Eng., FCAE*

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The Ontario government released its energy plan on July 10, 2023, titled Powering Ontario's Growth: Ontario's Plan for a Clean Energy Future. This plan is a good start toward achieving zero-emission energy systems: electricity, transportation, and heating. However, deciding on an optimum mix of supply technologies for the electricity system and other energy requirements is a constantly evolving process. It continuously evolves because energy technologies and their costs will change as we move toward net-zero for the electricity system in 2035, and eventually for the economy as a whole in 2050.

To ensure policy-makers and the public have better information to help them achieve net-zero for the electricity system by 2035, OSPE's Energy Task Force undertook to develop a simplified engineering and economic model of the electricity system. Running on Microsoft Excel, the model was developed to predict average retail electricity rates in 2035 under various net-zero supply mix cases and financial assumptions.

This seminar at the Engineering Conference will present the results of our analysis of various net-zero supply mix cases, and offer insights on how to achieve net-zero for the electricity system at the lowest cost. It will also identify new challenges that have to be managed as we transition to net-zero, and identify opportunities to decarbonize our building sector by better utilizing waste heat and curtailed electricity from our electricity system.

## Powering the Future: The Role of Nuclear Energy in Fighting the Climate Crisis



*Paul Acchione, P.Eng., FCAE  
(OSPE Energy Task Force)*



*Stephanie Smith, P.Eng.  
(Candu Energy/SNC-Lavalin)*



*Wes Johnsen  
(Bruce Power)*

This panel gathers a group of experts to discuss the role of nuclear energy in addressing climate change. The panelists will explore the benefits and drawbacks of nuclear energy as a low-carbon energy source, its potential to help reduce greenhouse gas emissions, and the challenges and risks of its deployment. They will also discuss the latest advances in nuclear energy technology (such as small modular reactors and advanced nuclear fuels) and their potential impact on the energy sector and climate change mitigation. The panel aims to foster an informed and constructive dialogue, and to provide insights and recommendations for policy-makers, industry leaders, and the public.

*Additional panelists for this session will soon be announced. Stay tuned to OSPE's digital channels for updates.*

Tags: [Climate Crisis](#) | [Energy](#) | [Innovation](#) | [Sustainability](#) | [Sustainable Cities](#)

## Raising the Bar: Transforming Workplace Culture for Safety and Inclusion



*David Garzon  
(White Ribbon)*



*Kelly Grieves, P.Eng.  
(Atura Power)*

This discussion explores key strategies for cultivating safe and inclusive workplace cultures. Panelists will identify how to transform organizational practices and foster environments where employees feel valued, respected, and empowered. From shifting compliance to embracing genuine commitment, guests will hear industry leaders' strategies for driving positive change, raising the bar for workplace culture, and fostering safe, inclusive and supportive workplace environments.

*Additional panelists for this session will soon be announced. Stay tuned to OSPE's digital channels for updates.*

Tags: [EDI](#) | [Engineering Profession](#)

## Transforming Industrial Maintenance with AI and IIoT



*Arun Gowtham, P.Eng., CRE, CMRP  
(Owtrun Reliability Inc.)*

Artificial Intelligence (AI) has the potential to significantly change manufacturing business and operations. Asset maintenance is a significant expense for manufacturers, and optimizing maintenance is one of the direct applications of AI. Together with the Industrial Internet of Things (IIoT), AI can empower practitioners to change how maintenance work is done. This presentation will explore how to successfully transform an organization's maintenance program with AI and IIoT, outlining overall strategy, planning, and execution.

Tags: **AI** | **Innovation**

### *Hear from the Speaker – Arun Gowtham, P.Eng, CRE, CMRP*

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Maintenance is often considered a “necessary evil” for industries; on average, it accounts for 20-40% of operating expenses per year across all industry sectors. However, its importance is much greater than commonly understood. Improper maintenance causes production losses, leading to dissatisfied customers and lost revenue. And for critical and safety applications, unresolved maintenance issues can create catastrophic hazards (such as train derailments) and sustainability issues (such as oil well leaks).

But despite the value of preventative maintenance, the traditional industry practice is to complete repairs after a mechanical failure, justified by the high cost of proactive repairs. The obsolescence of existing infrastructure is another obstacle to proactive maintenance models.

In recent years, though, Artificial Intelligence (AI) has upended businesses by unlocking value and drastically changing operating models. The low analysis cost and strong predictive power of data is transforming maintenance strategies across all sectors.

This presentation will explore how industries can transform their maintenance operations by implementing an AI-powered Predictive Maintenance (PdM) program, in which repair work is planned and executed at optimal times. These programs use algorithms to automate analysis and predict machine failures, empowering asset operators with information they can use to manage repair work, spare parts, and production. No more reacting to failures after a costly mechanical breakdown; with PdM programs, maintenance teams will be proactive and efficient. Whether you're an executive, engineer, or student, this talk offers key takeaways for your maintenance transformation journey.



## Unlocking Potential: Driving EDI through Hiring and Retention



*Katrina Williams, P.Eng.  
(Trojan Technologies)*



*Mandy Weigensberg,  
P.Eng., PMP  
(Hydro One Networks Inc.)*



*Marc St-Jacques  
(Notarius)*



*Nirav Patel  
(OPG/Atura Power)*

This panel will focus on EDI opportunities in recruitment and retention spaces. Panelists will have the opportunity to discuss recruitment practices that diversify their talent pool, and retention practices that foster diverse workforces and inclusive, equitable cultures.

*Additional panelists for this session will soon be announced. Stay tuned to OSPE's digital channels for updates.*

Tags: **EDI** | **Engineering Profession**

## Using AI for Image and Video Processing: Risks and Opportunities



*Emanuel Corthay, P.Eng.  
(Invision AI)*

The market is saturated with solutions that claim to use Artificial Intelligence (AI) to solve multiple image and video processing problems. This session will present the basics of AI applied to process multiple video streams, and explain the difference between off-the-shelf solutions and state-of-the-art solutions. Through practical examples based on Invision AI's Highway Monitoring product, the session will showcase the multisensor, 3D localized detection and tracking solution used to track and detect hazards, and outline how to apply these technologies to road intersections for Smart City applications. Finally, the session will explore the opportunities and limitations of these technologies, and equip guests to understand their risk profile and best practices for public deployment.

Tags: **AI** | **Innovation**

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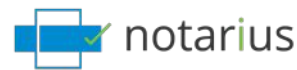


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7:00 AM - 8:15 AM		
8:15 AM - 8:45 AM		
8:45 AM - 10:00 AM	PLENARY SESSION 1	
10:00 AM - 11:00 AM	PLENARY SESSION 2	
11:00 AM - 12:00 PM		
12:00 PM - 1:15 PM	KEYNOTE PRESENTATION + LUNCH	
1:20 PM - 2:20 PM	BREAKOUT SESSION 1	<p><i>Driving Transformation: Leading the Way in EDI Change</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a></p>
2:25 PM - 3:25 PM	BREAKOUT SESSION 2	<p><i>Beyond Numbers: Measuring Authentic EDI Progress</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a></p>
3:30 PM - 4:30 PM	BREAKOUT SESSION 3	<p><i>Evolving Climate-Ready Resiliency in the Energy Sector</i></p> <p>Tags: <a href="#">Climate Crisis</a>   <a href="#">Energy</a>   <a href="#">Sustainability</a>   <a href="#">Sustainable Cities</a></p>
4:30 PM - 5:30 PM	BREAKOUT SESSION 4	<p><i>Engineering and the SDGs: Are We On Track?</i></p> <p>Tags: <a href="#">Climate Crisis</a>   <a href="#">Engineering Profession</a>   <a href="#">Sustainability</a></p>
5:30 PM - 7:30 PM		

**REGISTRATION AND CONTINENTAL BREAKFAST**

**WELCOME REMARKS**

*Powering the Future: The Role of Nuclear Energy in Fighting the Climate Crisis*

Tags: [Climate Crisis](#) | [Energy](#) | [Innovation](#) | [Sustainability](#) | Sustainable Cities

*Artificial Intelligence for a Resilient Future: Using AI to Combat the Climate Crisis*

Tags: [AI](#) | [Climate Crisis](#) | [Energy](#) | [Innovation](#) | [Sustainability](#) | Sustainable Cities

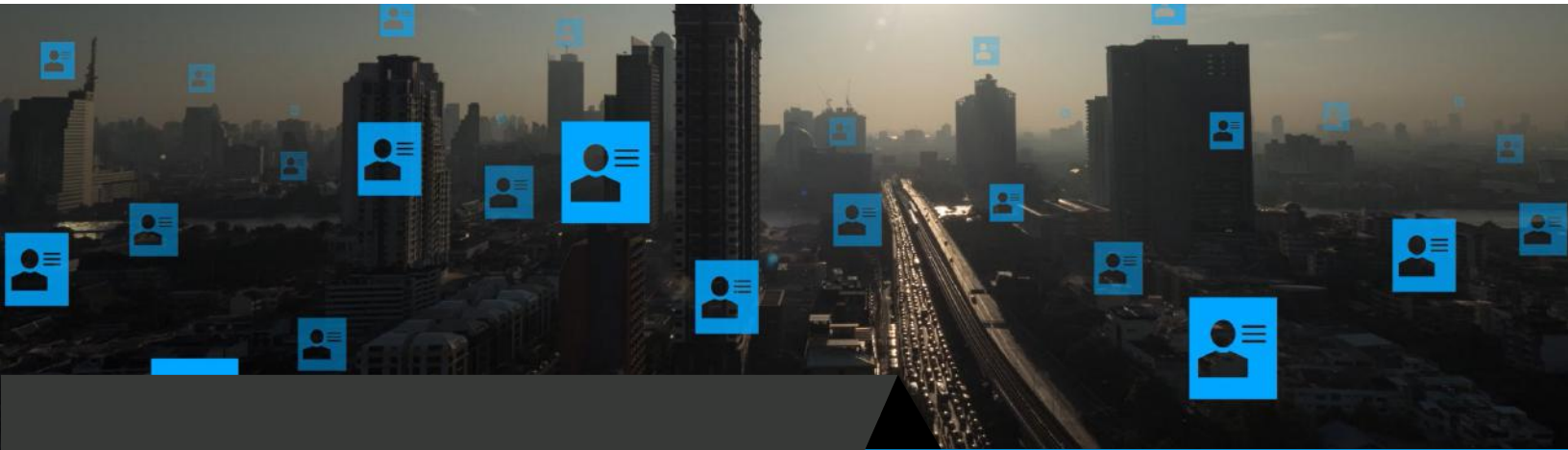
**TRADE SHOW FLOOR AND NETWORKING**

*AI-Fueled Innovation: The Next Frontier*

Tags: [AI](#) | [Innovation](#) | [Engineering Profession](#)

<p><i>Engineers' Ethical, Professional, and Human Rights Obligations as Technology Creators</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a>   <a href="#">Innovation</a></p>	<p><i>Net-Zero 2035: The Impact of Supply Mix Choices on Ontario's Electricity Grid</i></p> <p>Tags: <a href="#">Climate Crisis</a>   <a href="#">Energy</a>   <a href="#">Sustainability</a>   Sustainable Cities</p>	<p><i>The New Data Economy : Innovation &amp; Governance</i></p> <p>Tags: <a href="#">AI</a>   <a href="#">Engineering Profession</a>   <a href="#">Innovation</a></p>
<p><i>The Career Journey of the 21st Century Engineer</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a></p>	<p><i>Ontario's Energy Transition: The Electricity Sector's Role in a Sustainable Future</i></p> <p>Tags: <a href="#">Climate Crisis</a>   <a href="#">Energy</a>   <a href="#">Sustainability</a>   Sustainable Cities</p>	<p><i>Using AI for Image and Video Processing: Risks and Opportunities</i></p> <p>Tags: <a href="#">AI</a>   <a href="#">Innovation</a></p>
<p><i>Moving the Dial on Diversity &amp; Inclusion in Engineering</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a></p>	<p><i>Transforming Industrial Maintenance with AI and IIoT</i></p> <p>Tags: <a href="#">AI</a>   <a href="#">Innovation</a></p>	<p><i>Unlocking Potential: Driving EDI through Hiring and Retention</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a></p>
<p><i>Inside Brampton's Zero Energy Bio-Regenerative Food Shed</i></p> <p>Tags: <a href="#">Climate Crisis</a>   <a href="#">Energy</a>   <a href="#">Innovation</a>   <a href="#">Sustainability</a>   Sustainable Cities</p>	<p><i>Nature-Based Solutions for City Resilience: The Global Sponge Cities Snapshot</i></p> <p>Tags: <a href="#">Climate Crisis</a>   <a href="#">Sustainability</a>   Sustainable Cities</p>	<p><i>Raising the Bar: Transforming Workplace Culture for Safety and Inclusion</i></p> <p>Tags: <a href="#">EDI</a>   <a href="#">Engineering Profession</a></p>

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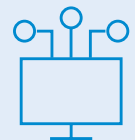
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### ENERGY TASK FORCE

Energy consumption is at the core of modern existence. OSPE's **Energy Task Force** explores how we can meet Ontario's current and future energy needs while balancing the impact on our communities, environment, and pocketbooks.

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# CERTIFICATE PROGRAMS

## Project Management Essentials for Engineers



**Dates:**

Tuesdays & Thursdays  
October 18 – October 27, 2023

**Price:**

\$695

**ONLINE**

OSPE's Project Management Essentials certificate program introduces the tools and techniques of modern project management and equips you to lead successful projects in your workplace.

Taught by engineering and project management expert Darya Duma, P.Eng., PMP, this hands-on course prepares learners to:

- develop a complete project management plan
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## Reports, Proposals, and Communications for Engineers



**Dates:**

Tuesdays  
November 7-21, 2023

**Price:**

\$679

**ONLINE**

This course, developed specifically for engineers, pairs the experiences of STEM professionals with knowledge from the publishing industry. The two 3-hour class sessions will outline the essentials of strong engineering reports, how to review and edit your team's work, and how to get results with your writing. Participants will submit a final project and receive personalized feedback from the instructor.

The course is delivered as an engaging, interactive, hands-on online seminar. Bring your pen! You'll use it.

## Writing that Sells: Technical Proposals and Pitches



**Dates:**

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**Price:**

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**ONLINE**

Learn how to set your proposal apart. This program equips you to deliver impressive proposals, build strong relationships, and win over potential clients. Developed for working professionals, the course lets you learn independently and provides opportunities to interact with your instructor through discussion boards and assignments.





## JOURNEY TO P.ENG.

[ospe.on.ca/oea/journey-to-p-eng](https://ospe.on.ca/oea/journey-to-p-eng)

### Preparatory Course for the National Professional Practice Exam (NPPE)

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OSPE's most popular course equips you to pass PEO's National Professional Practice Exam (NPPE). Taught by an experienced instructor, this course prepares students for the topics covered in the exam and includes a detailed review of sample exam questions. Students also enjoy on-demand access to pre-recorded prep videos.

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*Upcoming Examination Dates:*

*November 6-8, 2023*

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*June 2-5, 2024*



[ospe.on.ca/oea/journey-to-p-eng](https://ospe.on.ca/oea/journey-to-p-eng)



PROFESSIONAL  
ENGINEERS  
AWARDS

# 2023

## ONTARIO PROFESSIONAL ENGINEERS AWARDS



**November 3, 2023**

**Metro Toronto Convention Centre**

Presented annually since 1947, the Ontario Professional Engineers Awards (OPEA) recognize professional engineers in Ontario who have made outstanding contributions to their profession and their community.

This November, OSPE proudly hosts the 2023 OPEA Gala in Toronto. Tickets and partnership opportunities are still available for this signature event. Contact OSPE's Jason DiTommaso to put your organization front and centre at Ontario's most prestigious engineering awards ceremony.

**Jason DiTommaso | [jditommaso@ospe.on.ca](mailto:jditommaso@ospe.on.ca) | 613-986-1437**

## PROFESSIONAL ENGINEERS GOLD MEDAL

### DR. JOHN MCPHEE, P.ENG.



Dr. John McPhee is Canada's leading expert in system dynamics. He has been recognized with the NSERC Synergy Award for Innovation, 10 Best Paper awards, the OPEA Engineering Excellence Medal, and the CSME I.W. Smith Award. He is a Fellow of the CSME, CAE, EIC, and ASME, and in

2022 he was ranked in the Top 2% of Scientists Worldwide by Stanford University.

Dr. McPhee's impact on engineering practice is pervasive; his contributions have been cited 7000+ times and led to multiple patents and patent applications. His graph-theoretic methods have been licensed to thousands of engineers as the core of the MapleSim simulation software, which allows major companies (including NASA, Canon, JPL, Toyota, and Ford) to improve product and process design on dramatically shorter timelines and at reduced cost and risk.

Dr. McPhee held the NSERC/Toyota/Maplesoft Industrial Research Chair from 2009 to 2015, and is now the Tier I Canada Research Chair in System Dynamics. In these roles

he has secured over \$35 million in research funding, and applied his work to the design and control of assistive robotics, autonomous cars, biomedical technologies, sports equipment, hybrid and electric vehicles made in Canada, and more.

In addition to his research, Dr. McPhee has contributed enormously to engineering education. At Waterloo, he co-designed the university's Biomedical Engineering program and Canada's first Mechatronics Engineering program. He has personally supervised 29 postdoctoral fellows, 90 graduate students, and 65 undergraduate researchers - one of the world's largest groups in system dynamics.

Engineering activities outside Dr. McPhee's "regular employment" include founding flagship journals and conferences, serving on dozens of editorial and technical boards, and developing specialized webinars for academic and industrial practitioners. He has been a keynote speaker at NATO Advanced Study Institutes and leading conferences, presented his rehabilitation robot to MPPs at Queen's Park, and co-authored "Canadian Professional Engineering and Geoscience: Practice and Ethics," a key reference text recommended by the PEO for the National Professional Practice Exam.

## DISTINGUISHED LIFETIME ACHIEVEMENT AWARD

### DANIEL J. YOUNG, P.ENG.



Danny Young has served as a professional engineer for more than five decades, beginning his career as a project engineer for a multinational engineering company and retiring as a senior partner in a regional consulting engineering firm in London, ON. He was also a partner in a design-build

construction company. Danny's career has been marked by his entrepreneurial spirit, and he has owned companies that have been involved in diverse endeavours ranging from geo-spatial imaging to food service and retail development.

Outside of his professional work, Danny has volunteered to serve Ontario's engineering community. He ran for the first elected Board of the Ontario Society of Professional Engineers (OSPE) and spent the next 20 years supporting and building this newly formed association. Danny recognized the need to raise the profile of engineers and has been a passionate advocate for the profession of engineering.

Danny has served on OSPE's Premises Task Force and Bylaw Working Group, the PEO and OSPE Negotiating Committee, and the PEO, OSPE and Engineers Canada Tri-Partite Working

Group. He later served on the Society's Executive, HR, Audit and Finance, and other committees, and represented OSPE on the Ontario Ministry of Housing's Building Advisory Council. In addition, he filled key leadership roles at OSPE, serving as Chair in 2003, 2006 and 2014. He was also Acting CEO for a brief period in 2006, and again from 2010 to 2012. While overseeing day-to-day operations, Danny helped OSPE secure key corporate partnerships (including their home and auto group insurance plan) and launched The Voice magazine, the Society's signature publication.

In addition to serving the engineering community, Danny has been a member of the Board of Directors at Victoria Hospital London, University Hospital London, Children's Hospital Western Ontario, London Hydro, London Development Advisory Committee, Robarts Research Institute, and King's College. Additionally, he spent many years on the Board of Governors of Western University and chaired numerous committees. Danny also volunteered for the United Way London and Ratepayers Association Executive, coached team sports, and was very actively involved in the political arena, assisting candidates at all levels of government and managing numerous political campaigns. He continues to be actively involved in community service.

## ENGINEERING MEDAL – MANAGEMENT

### DAVE CROCKER, P.ENG.



As Vice President, Global Engineering & Technology at General Dynamics Land Systems (GDLS), Dave Crocker leads a team of innovative defence engineering talent across the globe.

Supporting the delivery of next generation solutions for the defence industry, Dave is an innovator who

develops industry-leading technology for ground combat vehicles. As a key member of the GDLS executive leadership team, he is responsible for streamlining processes, attracting top talent and establishing partnerships in North America and beyond.

Dave and his teams have significantly improved mine-blast survivability, helping keep the men and women who serve in uniform safe from harm. He has led many transformational projects for GDLS that have set the bar for other defence companies to emulate. The inventive and advanced design review and engineering processes Dave is responsible for has enabled his team to lead in the defence industry. The result is the creation of a strong culture of innovation in a global team

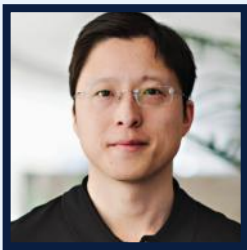
with thousands of professionals who are focused on agility, excellence, and innovation.

Dave has a reputation in the industry as a mentor, teacher and coach. He is the executive sponsor of one of the company's Employees Resource Groups, RISE, that supports young professionals. He also mentors several engineers and helps them pursue professional development opportunities and achieve leadership positions at GDLS.

When he is away from his professional role, Dave has volunteered as a coach with Junior Achievement London and delivered guest lectures on engineering leadership at Western University and many other professional forums. He is an avid biker and outdoorsman, and has enjoyed coaching for the London Youth Soccer Association as well as clubs in Australia and Wales while serving in leadership roles in those countries for GDLS.

## ENGINEERING MEDAL – ENTREPRENEURSHIP

### DR. ALEXANDER WONG, P.ENG.



Dr. Alexander Wong is a world-leading expert in integrative medical imaging systems and responsible artificial intelligence. His research group has published over 250 journal articles and 370 conference papers, produced 40 patents and patent applications, and received numerous prestigious

awards. His technologies have reached global markets through five start-up companies, deployment by multinationals, and widespread clinical implementation.

Dr. Wong has worked with global companies including Johnson & Johnson, Toyota, Nutrien, Microsoft, and Intel to move his research into real-world solutions. His precision pixel shift image enhancement technology is a core feature in Christie Digital's laser projectors, and his explainable AI technology was used by DarwinAI and Aspire Food Group to build an AI solution for automatically optimizing yield in protein production. This solution was recognized by the UN's AI Research Centre as one of the Top Ten Outstanding Projects leveraging AI to advance the UN's sustainability goals.

His research has also spurred the launch of five start-ups with his students, three of which are award-winning companies (Blue Lion Labs, Elucid Labs, and DarwinAI). DarwinAI has grown to over 35 employees and its customers include multi-nationals such as Pfizer, BMW, Honeywell, and Lockheed Martin.

In 2020, Dr. Wong launched COVID-Net, a global open-source, open-access initiative that leverages machine learning to aid front-line healthcare workers and clinical institutions. COVID-Net makes publicly available a large suite of open-source, tailored machine learning algorithms for screening, risk stratification, and treatment planning for COVID-19 patients, as well as fully curated benchmark datasets comprising of some of the largest, most diverse patient cohorts in the world. The project has received attention and accolades from global media outlets and is used by hundreds of industrial, academic, and clinical groups around the world.

*This citation is abridged. Read Dr. Wong's full award citation at [opeawards.ca/awardees](https://opeawards.ca/awardees).*

ENGINEERING MEDAL – ENGINEERING EXCELLENCE IN INDUSTRY

## DR. ALEKSANDER CZEKANSKI, P.ENG.



Dr. Aleksander Czekanski is an expert in engineering design and analysis, additive manufacturing, bioprinting, and soft tissue mechanics. He is currently Professor and NSERC Chair at York University's Lassonde School of Engineering, and previously served as Engineering Manager at Magna

Mechatronics, a tier-one automotive supplier.

During his time in industry, Dr. Czekanski provided engineering technical support to Magna and leading customers including GM, Ford, Chrysler, and BMW. He established guidelines and design standards to ensure consistency, efficiency and reliability across company operations, and created new engineering tools that eliminated repetitive processes, improved prediction accuracy and decreased customer response time. Today, these tools are used by Magna divisions worldwide.

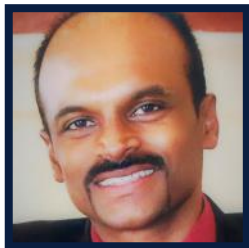
As an academic, Dr. Czekanski has played a key role in building York's undergraduate and graduate mechanical engineering programs. He has earned over 20 research awards totalling over \$10 million, and his research findings have been published

in over 160 journal and conference papers. He co-founded the Manufacturing Technology Entrepreneurship Centre (MTEC) and Centre for Automotive Research (CAR), research hubs that build on university-industry partnerships to support learning and innovation. He also founded the CREATE (Collaborative Research and Training Experience) Program, an NSERC-funded opportunity that supports engineering design and global entrepreneurship. Dr. Czekanski has also launched student design clubs, organized local and national design competitions, and facilitated co-op opportunities with leading industry partners.

In addition to the above, Dr. Czekanski serves as President of the Canadian Society for Mechanical Engineering (CSME), and previously served as President of the Canadian Engineering Education Association (CEEA). He has been recognized with numerous awards (including the NSERC Gold Medal, Lassonde Innovation Award, Lassonde Outstanding Service Award, President's University-Wide Teaching Award, Robert W. Angus Medal, and Excellence in Graduate Mentorship Award) and was named NSERC Chair in Design Engineering (2014).

ENGINEERING MEDAL – ENGINEERING EXCELLENCE IN INDUSTRY

## PATHIPAN SIVARASA, P.ENG.



Pathipan Sivarasa is an aerospace engineer with decades of experience in multidisciplinary projects related to modern integrated missions, avionics, electrical and weapon systems, training simulator design and hardware design. Throughout his career, he has worked at major

companies, including Spar Aerospace, L-3 Communications, Innotech Aviation-IMP Group, and Nortel Networks. He has led engineering design projects in both civilian and military aviation and currently works with General Dynamics Mission Systems-Canada as Deputy Program Manager of a large Canadian military aircraft contract.

Mr. Sivarasa also serves as President, Chief Executive Officer and Chief Engineer of Innowings Aerospace Inc., which was created to participate in an international competition to design a Vertical Takeoff and Landing (VTOL) personal flying vehicle for urban air mobility according to a set of challenging requirements. He and his team designed and built a prototype autonomous flying vehicle that can carry the average weight of a human. They were invited to participate at the GoFly final fly off at NASA's Ames Research Center (California) in 2020 as one of the top 20 teams out of 854 international entries. The \$1

million grand prize contest, sponsored by Boeing Aerospace, is still ongoing, and Mr. Sivarasa and his team are improving the design targeting the grand prize. The team is also adapting the design for industrial, agricultural, and military applications. Additionally, Mr. Sivarasa is working on another engineering project, designing a wing in ground effect craft to provide a cost-efficient transportation solution for remote locations.

Outside of the aerospace sector, Mr. Sivarasa founded the Oritha Company in 2010, using his engineering expertise to develop kitchen equipment. With Oritha, he managed the design and production of the Naveeno 95 Hand-Operated String Hopper Machine and the K-Drive Electrical Coconut Scraper, both of which are being sold internationally.

In addition to his professional work, Mr. Sivarasa actively volunteers within the engineering community. He is co-founder of the Launch Aerospace Academy and co-chair of the Algonquin College Automation and Robotics Engineering Program Advisory Committee. He has also mentored several young professionals who are now licensed engineers and works to raise awareness of climate change and greenhouse gas emissions with the next generation of engineering professionals, in addition to his work developing transportation technologies.

## ENGINEERING MEDAL – RESEARCH AND DEVELOPMENT

### DR. AMIR FAM, P.ENG.



Dr. Amir Fam is a worldwide authority in fibre-reinforced polymer (FRP) structural applications. He pioneered a fundamentally different approach to the design and construction of concrete bridges and marine structures, using FRP stay-in-place structural forms and tubes for rapid

construction (in lieu of conventional reinforcing bars). As a result of Dr. Fam's work, nearly 10,000 concrete-filled FRP tube (CFFT) piles have been installed to date in projects along the coasts of North America. Furthermore, Dr. Fam's innovative research directly resulted in building three unique bridges, each one being a world-first: Route 40 Bridge (Virginia), Taylor Bridge (Manitoba), and the Bombardier Transportation Monorail Test Track (Ontario).

Additionally, Dr. Fam received nearly \$4 million in funding to build and launch Canada's first and only Rolling Load Simulator (ROLLS). This large scale testing facility simulates in the lab heavy traffic over the life of a bridge to ensure longevity and safety for these structures and support new bridge construction technology.

Dr. Fam's expertise is further evident in the scope and impact of his research. He is the author of over 390 refereed publications, which have been cited by others over 9600 times. He has delivered keynote presentations at numerous international conferences, and is a fellow of multiple professional bodies (including the Canadian Academy of Engineering, Engineering Institute of Canada, Engineers Canada, and American and Canadian Civil Engineering Societies) as well as a member of the Royal Society of Canada's College. Dr. Fam has received numerous awards for his publications, including the T.Y. Lin Best Paper Award (American Society for Civil Engineers) and Casimir Gzowski Medal (Canadian Society for Civil Engineering), and is the Co-Editor-in-Chief of the Canadian Journal of Civil Engineering.

Dr. Fam has a proven record of success as a mentor and graduate supervisor. He has supervised 24 doctoral students, 45 master's students, and 16 post-doctoral fellows and visiting scholars. Two of his trainees are now Tier II Canada Research Chairs, seven are faculty at various universities, and one was appointed Federal Deputy Minister of Transportation and then Vice Dean Research abroad.

## ENGINEERING MEDAL – ENTREPRENEURSHIP

### DR. MARIANNA KONTOPOULOU, P.ENG.



A Dr. Marianna Kontopoulou is an internationally recognized expert in sustainable polymers and advanced functional materials for technological applications. Her research group has produced numerous groundbreaking findings, including innovative, eco-friendly, and industrially feasible

methods for producing graphene platelets, which can be used in sustainable solutions for thermal management, lubricants, energy storage devices, and more.

Dr. Kontopoulou's group has also pioneered the production of electrically conductive, lightweight thermoplastic polymer composites. These composites boast superior mechanical properties and can be used for automotive applications and fuel systems, anticorrosive coatings, and thermal management systems, such as electronic device housings.

In addition to the above, her group has developed environmentally friendly compounding processes that produce fully biodegradable products with comparable performance to petroleum-based polymers. These bioplastics can be used in packaging, foams, and other single use products, and represent a potential breakthrough in sustainable product development

aimed at minimizing environmental footprint.

Dr. Kontopoulou's publication record includes over 100 refereed publications in high impact factor, peer-reviewed journals (cited over 4500 times), over 100 conference presentations and refereed conference proceedings, 33 keynote and invited lectures and seminars, three patents, and two book chapters. To date, she has received over \$18 million in funding from provincial and federal agencies (including over \$3 million as principal investigator). Her work has also been supported by leading industry partners including DuPont, Alcerco and Novelis. She has trained 75 highly qualified personnel, including post-doctoral fellows, visiting scholars, and doctoral and master's students.

Over the course of her career, Dr. Kontopoulou's contributions to research have been recognized with the Morand Lamba Award (Polymer Processing Society), the Way Memorial Trust Award (Queen's University – Faculty of Engineering and Applied Science), and the Research Leaders Fund Award (Queen's University). She is the Associate Editor of the International Polymer Processing journal and member of the editorial boards of two journals. She has served as the President of the Canadian Society of Rheology, multiple conference organizing committees, and as guest editor for two journal special issues.

## THE CITIZENSHIP AWARD

# KAREN WEBB, P.ENG.



Karen Webb has volunteered thousands of hours to support marginalized groups and leave an enduring impact on her community, both in the engineering realm and beyond. She began her volunteer service to the profession as a member of PEO's Women in Engineering

Advisory Committee (WEAC) in the 1990s. As Co-Chair of WEAC, she was instrumental in modernizing the Professional Engineers Act to include harassment in the definition of professional misconduct. This achievement has had a major impact on the participation of women and diverse ethnic groups in the engineering profession.

Ms. Webb also served on the Executive with the Wardens of Camp One (Ritual of the Calling of an Engineer) from 2009-2019. Under her leadership as Chair, Camp One modernized the ring replacement process, updated pre-ceremony procedures for greater consistency, and actively sought to recruit a more diverse group of wardens. Today, she continues to support the ongoing evolution of the ring ceremony.

Outside of the engineering community, Ms. Webb has served on the boards of numerous community organizations. She has sat on the Scarborough Health Network Board of Directors since 2016, currently as Vice-Chair. During this time, the SHN board has led the integration of three hospital sites into one and guided the journey towards a new standard of care and health equity, notably during the COVID-19 pandemic. In addition to this role, Ms. Webb serves (or has served) on the Boards of Up With Women; Lakefront Utility Services Inc. (Town of Cobourg); Japanese Canadian Cultural Centre; CRAM Toronto – Extraordinary Ideas Unleashed; CPAC Foundation; Seneca College; and MicroSkills.

*This citation is abridged. Read Ms. Webb's full award citation at [opeawards.ca/awardees](https://opeawards.ca/awardees).*

## THE PROJECT OF THE YEAR AWARD

# ENGIQUEERS CANADA

### VANESSA RAPONI, P.ENG. AND ALEXANDER DOW, P.ENG.



EngiQueers Canada is a non-profit organization that celebrates, promotes, and advocates for diversity and

inclusiveness in engineering, with a specific focus on 2SLGBTQ engineering students. Built on the pillars of Professional Development, Education and Advocacy, and Social Connection, the organization represents over 30 2SLGBTQ and EDI clubs at engineering schools across Canada.

EngiQueers Canada was formed in 2017 after various 2SLGBTQ student clubs identified a need and opportunity to expand their activities nationwide. Vanessa Raponi, P.Eng. (founder of McMaster EngiQueers) served as the organization's first President and CEO, and Alexander Dow, P.Eng. (then-president of the McGill Queer Engineering Club) joined as Vice-President and CFO.

Under Raponi and Dow's leadership, the organization



earned non-profit status and expanded rapidly in Ontario and Quebec, with established 2SLGBTQ groups joining the growing group. At the same time, EngiQueers Canada formed chapters where none previously existed, including University of Calgary, UPEI, Dalhousie, Ontario Tech, and Concordia. Raponi and Dow also established partnerships with regional student organizations (CFGES, ACES, CREIQ, ESSCO and WEST) to build a diverse, inclusive profession.

In addition to their campus-based advocacy, EngiQueers Canada personnel have become trusted inclusivity consultants. Organizational leaders have led EDI sessions at conferences including the 2017 NSERC Gender Summit and 2018 Ontario Science Centre Pride in STEM Day.

*This citation is abridged. Read the full award citation at [opeawards.ca/awardees](https://opeawards.ca/awardees).*



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