

EXCELLENCE IN ENGINEERING

The 2018 Ontario Professional Engineers Awards

DESIGN OPTIMIZATION PIONEER

John Bandler: multi-talented engineering innovator, entrepreneur, artist and writer receives prestigious award

THIS YEAR'S OPEA GOLD MEDAL RECIPIENT, JOHN BANDLER, is not only an outstanding engineer, he's also a university professor, inventor, entrepreneur, novelist, playwright, screenwriter, artist, public speaker, presentation coach and mentor. And along the way, he discovered a concept called "space mapping" that was a game-changer for the engineering profession.

An electrical engineer by training and now professor emeritus at McMaster University in Hamilton, Ontario, Dr. Bandler is the global microwave community's most recognized figure in design optimization who engineered innovative forms of optimization into microwave computer-aided design (CAD) practice. His pioneering research – optimization algorithms, sensitivity analysis, yield-driven design, fault diagnosis, nonlinear optimization and electromagnetic optimization – built microwave CAD's foundations, upon

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JOHN WILLIAM BANDLER
OC, P.Eng.
Professor Emeritus, McMaster University

which many subsequent researchers built their profession.

But it's the discovery in 1993 of the mathematical formula called space mapping that he considers the pinnacle of his storied career. Space mapping was soon applied across other engineering disciplines and resulted in optimized design. Problems that would typically require weeks of computations on powerful computers could be reduced to hours or even minutes.

Dr. Bandler says space mapping allows engineers to exercise their traditional "feel" for a problem – an intangible concept that has long been used but seemingly disappeared once computerized design became the norm in engineering.

For example, before the advent of computers, he says engineers designed and manufactured complex structures and products like bridges, trains, TVs and radios using their expertise and "feel," but "feel" was difficult to quantify.

"I hit upon this idea of space mapping and was amazed to find it's actually a very simple mathematical explanation of an engineer's feel for a problem. And that's why it startled so many people; it was deceptively simple and yet able to be applied to very complex problems," he says.

Dr. Bandler was born in Jerusalem and grew up in Cyprus. His engineering journey began at Imperial

College, London, UK. He moved to Canada in 1967 to teach engineering at the University of Manitoba and joined McMaster two years later.

In 1983, he established a company, Optimization Systems Associates, to commercialize his research by creating the world's first design-centring and yield-driven design software, the first nonlinear microwave circuit optimization software and the first electromagnetic optimization software. Initially considered technical fantasies, these tools are now used regularly by microwave designers around the world. The company was acquired by Hewlett-Packard in 1997.

The way Dr. Bandler describes it, his attraction to the creative arts was quite serendipitous.

"One day I found myself in my mother-in-law's studio with a paintbrush in hand and a canvas on an easel, so I started painting," he says. "Until then I didn't even know I had an interest in art. I was strictly an engineer and an academic, and a committed entrepreneur."

But the art bug bit and, in spite of a heavy academic and business workload, he went back to school as a part-time student at the Dundas Valley School of Art near Hamilton. What followed were dozens of courses and workshops in art and an interest in art history. Next came creative writing, including several plays that have been performed at the Hamilton Fringe Festival.

"I can honestly say I literally stumbled into every artistic venture I found myself in and, of course, it opened up all kinds of new ways of looking at things," he adds.

Finding the time for his creative pursuits was made easier, he says, by a well-organized life and "some brilliant people" including students at McMaster and staff at his company.

But it was his own brilliance that won Dr. Bandler acclaim at home and abroad. Academic and commercial groups under his leadership have produced thousands of reports, research notes and documents, and software manuals.

He has published over 500 technical papers and contributions to books, and won numerous professional awards, including the highest honour of the Canadian arm of the Institute of Electrical and Electronics Engineers: the A.G.L. McNaughton Gold Medal.

Dr. Bandler was inducted as an Officer of the Order of Canada in 2016 for his scientific contributions that helped position Canada at the forefront of microwave engineering.

What's left for a man who has achieved so much? He still has one wish.

"I would love to see the cognitive implications of my space mapping concept – the engineer's mysterious so-called 'feel' for a problem – studied in a neuroscientific setting."

No doubt, that would make for some interesting reading.



2018 ONTARIO PROFESSIONAL ENGINEERS AWARDS GALA

Since 1947, the Ontario Professional Engineers Awards (OPEA) gala has served as the province's most prestigious engineering event of the year. This annual gala brings together industry innovators, business leaders and policy-makers to honour and celebrate engineering excellence and achievement.

The 2018 OPEA gala is proudly co-presented by Professional Engineers Ontario (PEO), the profession's regulatory body, and the Ontario Society of Professional Engineers (OSPE), the profession's advocacy association.

LOCATION:
International Centre
Orion Ballroom
6900 Airport Road
Mississauga, Ontario

DATE: November 17, 2018

Today, engineers continue to lead the advancement of every facet of society, creating innovations that are launching Canada into its exciting future. From aerospace and automotive to clean technology, biomedical, mining and robotics, the innovations of engineers continue to guide Ontario's major industries and solve society's most pressing challenges.

PEO and OSPE congratulate the 2018 award recipients, all of whom illustrate the highest standards and ideals of the engineering profession.

Learn more:
opeagala.ca

AWARD FOR ENGINEERING PROJECT OR ACHIEVEMENT

The OPEA's 2018 Award for Engineering Project or Achievement, York Region's 2nd Concession Project, connects growing communities and improves mobility while protecting the environment and encouraging healthy activities such as walking and cycling. Completed in August 2017, the \$105-million project included road widening, trails, three bridges, retaining walls, active transportation infrastructure, stormwater management, gravity and large force main sanitary sewers, and a watermain. The initiative was completed in less than nine years including planning, detailed design and construction. Positive impacts to the local community are immense. The project increases travel options through greater road capacity and access to York Region's road network; and trunk sanitary sewers and watermains provide essential servicing to new residents and allow for future growth.



Committed to THE FUTURE OF ENGINEERING

Ontario has two organizations that are strongly committed to the future of the engineering profession. Although Professional Engineers Ontario (PEO) and the Ontario Society of Professional Engineers (OSPE) have different mandates, they have worked together for many years to advance the profession.



REGULATES

The mission of PEO is to regulate and advance the practice of engineering to protect the public interest.

- Licensing individuals who have met the rigorous qualifications
- Disciplining licence holders who fail to maintain the profession's technical and ethical standards
- Ensuring that only licence holders practice professional engineering
- Establishing and maintaining standards of practice



BEHIND EVERY GREAT ENGINEER.

ADVOCATES

OSPE is the advocacy voice of the engineering profession in Ontario, representing the entire engineering community.

- Raising awareness of the important role engineers play in society
- Influencing public policy that affects the profession
- Connecting engineering talent with employers
- Providing opportunities for ongoing learning, networking and community building

Working together for the FUTURE OF ENGINEERING IN ONTARIO

OSPE and PEO partner to celebrate the engineering profession each November by co-hosting the annual Ontario Professional Engineers Awards Gala. Together, these organizations participate in National Engineering Month and promote engineering licensure in Ontario to graduates of Canadian and international engineering programs.

The Ontario Professional Engineers Awards are presented annually to celebrate the accomplishments of our province's engineers and their relentless commitment to innovation and excellence.

ENGINEERING MEDAL - ENGINEERING EXCELLENCE



GARY J. E. KRAMER, BSc, MASC, P.Eng., PE
Senior VP & Global Practice Director (Tunnels), Hatch

As one of the world's top tunnelling experts, Gary Kramer has managed design and construction for many high-profile and technically challenging tunnelling projects, including more than 140 kilometres of constructed tunnels for transit, water, wastewater and energy works.

Under Mr. Kramer's leadership, Hatch's tunnels practice grew from 50 to over 200 staff working in more than five countries. During this time, he has become recognized within the engineering community as much for building tunnels as for building up people through a unique combination of technical leadership and continuous improvement as well as developing and mentoring younger staff.

As a sought-after presenter at the world's most prestigious tunnelling institutions and conferences, Mr. Kramer is a superb ambassador of Canadian engineering.



DAVID JOHN LAPP, P.Eng., FEC, FCAE, IRP
Manager, Globalization and Sustainable Development, Engineers Canada

As the effects of climate change threaten Canada's – and the globe's – public infrastructure, David Lapp is working to help mitigate these potential risks and build resilience into public buildings, transportation, energy, water and wastewater systems.

Mr. Lapp leads a national project assessing potential climate change impacts on Canada's public infrastructure, which has resulted in the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol – a risk assessment tool being adopted in Canada and elsewhere and recognized by the United Nations. *Engineers Canada's National Guideline: Principles of Climate Adaptation and Mitigation for Engineers* was completed based on the experience gained from the application of the PIEVC Protocol.

Mr. Lapp's work has enhanced knowledge and understanding of the effects of extreme weather events and climate change in engineering practice.

ENGINEERING MEDAL - MANAGEMENT



PAUL MAY, P.Eng.
Vice President, Project Implementation, York Region Rapid Transit Corporation

With its population doubling to 1.1 million over the past 30 years, the Greater Toronto Area's York Region has relied on Paul May's engineering and management expertise to help oversee and guide this rapid growth.

Early in his career, Mr. May provided forecasting techniques and travel studies that were key to planning for future growth. He later oversaw all York Region road and transit infrastructure, and water and wastewater programs. In his current role, he oversees the design and construction of the region's \$1.75-billion rapid-transit system, which includes "rapidways" for buses, new utilities, tree-lined sidewalks and bike lanes.

Mr. May is known as a leader who empowers staff to be creative and innovative, challenging them to take initiatives and deliver results as efficiently as possible.



TERRANCE FREDERICK NORD, BSc, P.Eng.
President, TNCC Global Aviation

Known as "an old aviation hand" after almost 50 years in the industry, Terrance Nord has made major contributions to aviation excellence in board governance; cargo, logistics and airline operations; and engineering leadership.

As a Greater Toronto Airports Authority board member, Mr. Nord served during a period when the organization grew to more than 45,000 employees serving 65 airlines. At DHL Express, he led a team that established a global cargo air network for the firm and later oversaw operations moving freight across an intercontinental air route covering most of the planet and operating 1,200 daily flights.

He also managed support infrastructure for engineering, quality control, IT, financial and fleet planning, budget controlling and strategic alliances.

A former Royal Canadian Air Force captain, Mr. Nord also played a leadership role in the creation of Canadian Airlines – Canada's first major airline merger.

ENGINEERING MEDAL - RESEARCH AND DEVELOPMENT



ASHRAF EL DAMATTY, BSc, MSc, PhD, P.Eng., MBA, FCSCE, FEIC
Professor/Chair, Civil and Environmental Engineering, University of Western Ontario

A research pioneer in the stability of water structures and the effects of severe wind events on power lines, Ashraf El Damatty is one of Canada's top structural engineering researchers.

Dr. El Damatty's research on the behaviour of transmission line structures under tornadoes and downbursts led to the development of an innovative software package for designing transmission infrastructure that are better able to withstand the pressures inflicted by extreme weather. And his work on seismic behaviour of elevated conical water tanks helped develop innovative design methodologies for managing hydrostatic and earthquake loads that have been used in Canada, the U.S., Mexico and Japan.

Dr. El Damatty's research is critical to utilities worldwide since nearly 80 per cent of transmission structure failures can be attributed to high-intensity winds.



WINNIE YE, PhD, P.Eng., SMIEEE
Professor, Carleton University

Winnie Ye is at the forefront of silicon photonics research, an emerging technology with great potential to impact applications in fields such as next-generation communication systems and interconnects for data centres, sensing for medical and life sciences, and high-performance computing for telecommunication.

Dr. Ye has earned a reputation as a leader in her field based on the international exposure and the impact of her research, which includes 164 publications, reports and presentations, and three industry-relevant patents. Her work on all-optical logic gates and subwavelength interconnects will enable next-generation data communication and telecommunication systems.

Dr. Ye has built an impressive research portfolio, securing nearly \$2.5-million in research funding from provincial and federal sources, and contributions from industry.

CITIZENSHIP AWARD



NICOLA "NICK" DI DONATO, BSc, P.Eng.
President and CEO, Liberty Entertainment Group

If you have enjoyed a night out at one of Liberty Entertainment Group's signature Toronto hotspots like the Liberty Grand, Cibo Wine Bar or BlueBlood Steakhouse, it's thanks to the vision and drive of engineer and entrepreneur Nick Di Donato.

Combining his engineering skills, 25 years of design and construction experience, and a passion for creation and architecture, Mr. Di Donato has breathed new life into historically significant properties including Toronto's Casa Loma, the Consumers Gas building, the York County Court House and the Liberty Grand.

He also shares his experiences as a mentor to students at the University of Toronto's Institute for Leadership Education in Engineering.

Community involvement has been a priority for Mr. Di Donato, who serves on various boards and committees for institutions including SickKids Hospital and Variety Village.

ENGINEERING MEDAL - YOUNG ENGINEER



JENNIFER DRAKE, PhD, P.Eng.
Assistant Professor, Civil Engineering, University of Toronto

By the time Jennifer Drake was finishing up her PhD at the University of Guelph, her research on the effectiveness of permeable pavements in reducing stormwater volume and pollution levels in drainage systems was impacting stormwater management across North America.

In 2014, Dr. Drake developed new regional flood equations for the Ontario Ministry of Transportation for ungauged watercourses. These equations provide more accurate representation of current watershed and stream flow conditions, as well as standardized peak flood estimation methods for the entire province. In 2018, she received an Early Researcher Award by the Ontario Ministry of Research and Innovation for her work on Low Impact Development stormwater management.

Dr. Drake is committed to increasing the public's knowledge and understanding of issues related to urban flooding and flood prevention.

ENGINEERING MEDAL - ENTREPRENEURSHIP



DAVID BECKMAN, P.Eng.
President and CEO, Zeton Inc.

David Beckman and his Zeton co-founders moved decisively in the mid-1980s to meet a need in the chemicals and energy industries to design and fabricate pilot and small-scale production plants that could take complex process technologies to market, efficiently and cost effectively.

Since then, the company has grown into a world leader in its field, completing over 750 projects across a broad range of industries, and has expanded from a staff of nine to 150 people in Burlington, Ontario, and 100 people in the Netherlands, where the company established a European branch in 1996.

Mr. Beckman instils his engineering and business philosophies in others, evidenced by insisting employees be shareholders of Zeton and share in the profits.

2018 ONTARIO PROFESSIONAL ENGINEERS AWARDS A Special Thank You to Our Partners

Gala Partners



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