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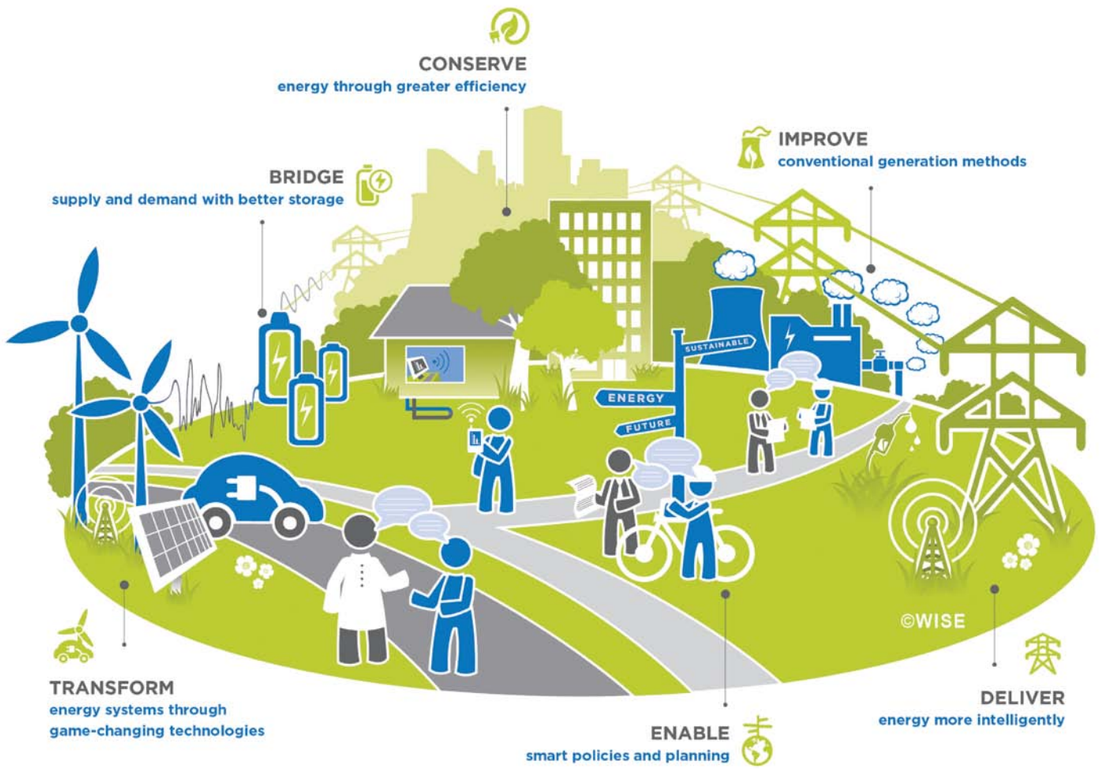
September 2012

2011/2012 ANNUAL REPORT



The world economy runs mainly on fossil fuels.

Solving our complex global energy problem
– and the associated climate issues –
requires multidisciplinary action on many fronts.

At WISE,

we invest in collaborative research across disciplines,
bringing together a diverse range of
partners to advance energy solutions and
policies for a sustainable energy future.

vision: clean energy, accessible and affordable for all.

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BUILDINGS | CARBON CAPTURE AND STORAGE | FUEL CELLS | NUCLEAR | POLICY | PLANNING
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Dear Friends & Colleagues,

We face a global challenge:to find new ways to meet our growing energy needs while simultaneously protecting the planet that sustains us.

To address this challenge, we need global solutions: a portfolio of energy technologies, policies and systems that affordably and cleanly transform the Earth's abundant energy resources into useful energy services, when and where we need them.

Since our founding in 2008, WISE has grown in our scientific capacity and our resolve to tackle these grand energy challenges. Faculty, staff and students continue to be engaged across a wide spectrum of energy research and educational activities. We are delighted to see our membership broaden – we now cover all faculties at the University of Waterloo – and our strength increase in key areas such as bioenergy and smart grids.

Our members are trailblazers, unafraid to cross traditional boundaries, to think in new ways and to take risks in their quest for solutions. We applaud their courage and their commitment in pursuing innovative research.

What's next for WISE?

In the coming years, we will engage more deeply in crosscutting themes, such as exploring the connections between water and energy. We will work to integrate science into public policy. We will continue to develop strategic relationships that enhance our research capacity and impact. Finally, we plan to "seed" important enabling initiatives, such as Drive4Data, that will advance our research, empower our students and create a uniquely innovative environment.

Together, we look forward to transforming our energy future.

Sincerely

Jatin Nathwani
Executive Director

Tracey Forrest
Director

COLLABORATE / REACH OUT / INFLUENCE
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WISE: Focal point of energy studies at the University of Waterloo

mission:

To conduct original research and develop innovative solutions and policies to help transform the energy system for long-term sustainability

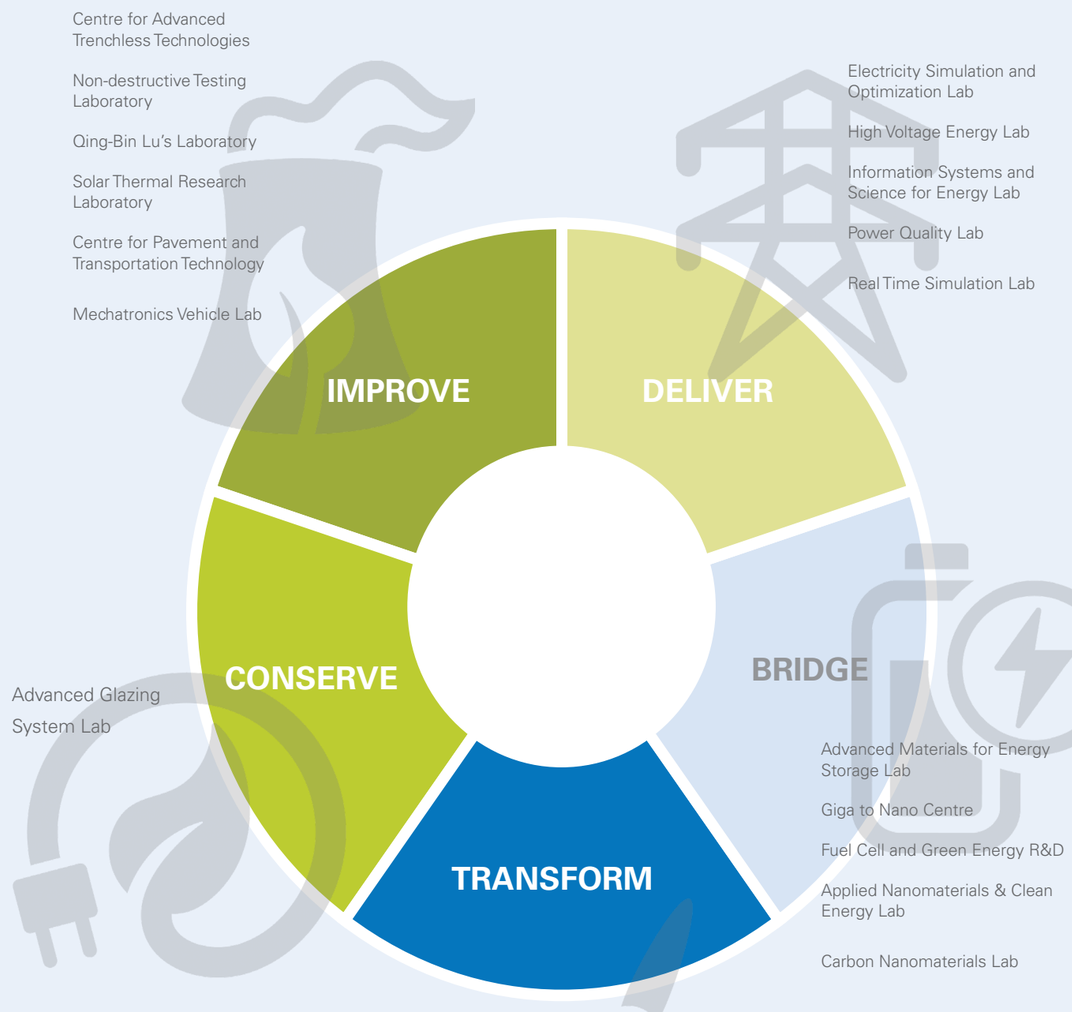
founded:
2008

number of members:
93

number of research chairs:
18

number of laboratories:
31

Research laboratories



Centre for Advanced Trenchless Technologies

Non-destructive Testing Laboratory

Qing-Bin Lu's Laboratory

Solar Thermal Research Laboratory

Centre for Pavement and Transportation Technology

Mechatronics Vehicle Lab

Electricity Simulation and Optimization Lab

High Voltage Energy Lab

Information Systems and Science for Energy Lab

Power Quality Lab

Real Time Simulation Lab

Advanced Glazing System Lab

Advanced Materials for Energy Storage Lab

Giga to Nano Centre

Fuel Cell and Green Energy R&D

Applied Nanomaterials & Clean Energy Lab

Carbon Nanomaterials Lab

Applied Catalysis Lab

Centre for Advanced Photovoltaic Devices and Systems

Green Chemistry and Engineering Lab

Centre for Advanced Materials Joining

Student Research Centre

Fluid Mechanics Research Lab

Kleinke Research Centre

Laboratory for Biomanufacturing

Laboratory for Emerging Energy Research

Air Pollution Research and Innovation Lab

Printable Electronic Materials Lab

Reaction Engineering Lab

UW Live Fire Research Centre

Wind Energy Laboratory

Wind Turbine Acoustics Lab

COLLABORATE

At WISE, we believe the biggest breakthroughs come from uniting leading researchers from dozens of disciplines. That's why our membership spans 22 departments and encompasses every faculty at the University of Waterloo.

However, we're not content to simply gather great minds under the WISE umbrella. Rather, we actively work to foster connections amongst our members and promote the kind of multidisciplinary projects required to solve complex, global problems.

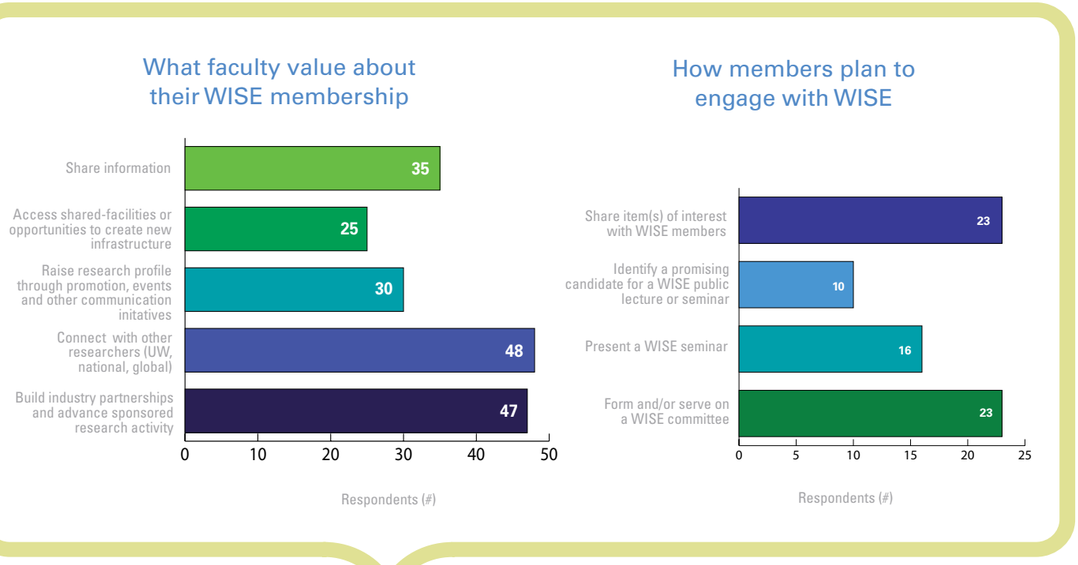
new large-scale multi-disciplinary projects initiated in 2011/2012:

10

- Applied Science
- Arts
- Engineering
- Environment
- Mathematics
- Science

"I talk to my colleagues at other universities and tell them the kind of support I get at WISE and they just can't believe it."

PROF. SRINIVASAN KESHAV
Professor, Cheriton School of Computer Science



UNDERSTANDING OUR MEMBERS

Serving our members starts by understanding their needs and priorities. We do this through one-on-one meetings throughout the year, as well as online surveys.

DEVELOPING OPPORTUNITIES FOR MULTIDISCIPLINARY WORK

WISE searches out opportunities to unite our members on discipline-spanning projects – projects like WWF's large-scale Renewable Energy Map for Canada.

When WWF needed a scientific partner, WISE was the destination of choice. We drew upon our breadth and depth of expertise to lead the scope development for this multi-million dollar study. The resulting proposal included 10 WISE members spanning seven departments and lays the groundwork for evidence-based research with national impact.

PROF. CLAUDIO CAÑIZARES

Professor, Department of Electrical and Computer Engineering

"WISE sets a high bar for service excellence. They provide great support at all levels – from logistics to the development of research proposals with industry partners. As just one example, Tracey made us aware of the Natural Resources Canada ecoEnergy Innovation Initiative and went above and beyond to ensure our proposal was a success. Overall, WISE is an invaluable resource to its members and the University at large."

SECURING PROMISING NEW SOURCES OF RESEARCH FUNDING

WISE keeps our members well informed about important sources of funding. But our services don't stop there.

We also help them secure access to additional funds and/or physical assets and mobilize the necessary commitments. We do this by leveraging our extensive network of partners and our formal collaboration arrangements, such as our memorandum of understanding with Natural Resources Canada (NRCan).

Take the example of NRCan's new Ecoenergy Innovation Initiative. WISE was involved in more than a dozen submissions, representing a total project value of approximately $13M. Five letters of intent reached the proposal stage in this highly competitive selection process. Currently, two proposals worth over $4M are in final discussions with NRCan.

Meanwhile, several WISE members benefitted from 2011 Smart Grid funding from the Ontario Centres of Excellence (OCE). Out of a total OCE investment envelope of $2.86M, WISE researchers were involved in $2.19M of approved projects, representing 77 per cent of the entire fund.

CREATING THE SPACE FOR COLLABORATION

At WISE, multidisciplinary collaboration doesn't just happen on paper. We help our faculty and principal investigators to host workshops designed to shape the research agenda or seed early-stage collaborations. We take care of formulating agendas, selecting venues, managing logistics and securing funds for promotion and follow-up. That leaves our members free to focus on what they do best: advancing research. Meanwhile, WISE Membership Meetings provide informal and formal ways for faculty to connect with colleagues in the sustainable energy field. These thrice-yearly talks by WISE members cover a range of topics, from converting biomass into gasoline to greenhouse gas emissions from heavy oil projects.

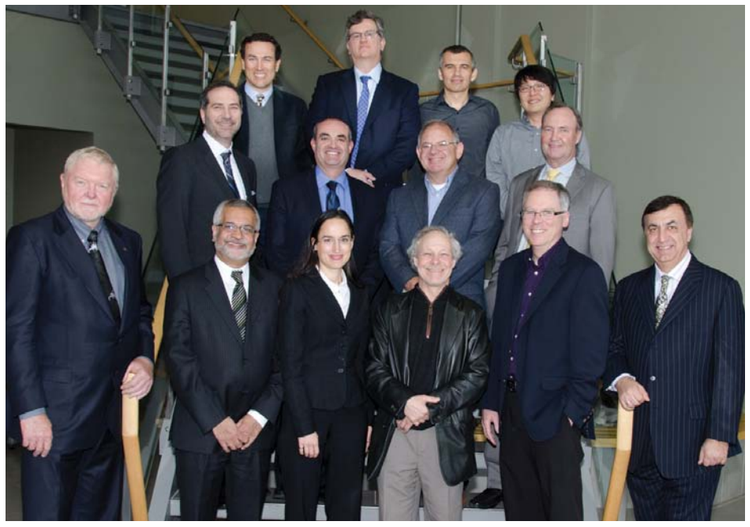
We also host twice-yearly pizza lunches for undergraduate and graduate students, connecting them with WISE faculty and staff. These events offer a collegial environment for students to broaden their network and their perspective on sustainable energy issues.

PROMOTING OUR MEMBERS' EXPERTISE

To facilitate collaboration and showcase the research capabilities of our members, we launched a new, transformed WISE website in 2011. The highly functional content management platform includes:

- Dynamic news feeds
- A powerful keyword index for our researchers – unique to the University of Waterloo – that allows outside parties to easily look up specific areas of expertise
- Research spotlights highlighting our members' latest work

Advisory Council meetings offer an opportunity for Council members, WISE researchers and administrators to connect, discuss member research and gain insights into challenges facing the corporate energy sector.



PROF. MAURICE DUSSEAULT

Professor, Department of Earth and Environmental Sciences

"For me, WISE has opened up new contacts and introduced me to new ideas that will impact the applications areas that I target in my research. WISE provides access to a broad view of issues and technologies that a single person can never have. The fostering of interdisciplinary work and integrated engineering activity are part of the WISE mandate, and this is highly valuable to trigger new ideas, technologies and applications. WISE has a vital role to play in my work, and in the work of others."

DRIVING RESEARCH ADVANCEMENT

WISE constantly looks for ways to further the work of our members. For example, more than two dozen WISE members conduct research involving electric vehicles (EVs). The problem they face is limited real-world data, forcing them to rely on small-scale pilots or proxy information. That's why WISE launched the Drive4Data initiative in 2012.

This unique initiative brings together industry and local non-profit organizations to capture large-scale real-world data from plug-in vehicles. As a result, WISE researchers have access to information on everything from vehicle use and charging patterns to battery range and powertrain performance.

Already, the initiative is having an impact in Waterloo Region. In 2012, a WISE member research partnership with Grand River CarShare was launched to investigate local opportunities for EVs and barriers to their use.

The Waterloo Institute for Sustainable Energy gratefully acknowledges the financial support of the Community Environmental Fund administered by the Regional Municipality of Waterloo.

REACH OUT

Change requires many partners. That's why we actively engage with the world beyond our hallways. We're working closely with industry, government and the non-profit sector in Canada and abroad to create sustainable energy solutions. We foster connections, establish formal partnerships and pursue major initiatives with external organizations.

As a result, our members gain access to new partners, financial and/or in-kind support, shared research facilities and meaningful data collection.

Furthermore, we make external collaborations as easy as possible for WISE members. We provide a wide range of management services, including drafting progress reports and producing financial statements, as well as assisting with proposals, applications and much more.

major partnerships established in 2011/2012:

11

visits hosted from companies, institutions, government partners and non-profit organizations:

43

CONNECTING OUR MEMBERS WITH INDUSTRY

WISE forges links between academia and industry in many ways. We help our members to ground their research in real-world problems by establishing dialogues with external organizations and participating in key energy boards and forums. Our extensive online library of resources keeps WISE members up to date on industry trends, issues and developments.

Last but far from least, we organize events that bring potential collaborators face to face. In 2011/12, these included:

► INVITED PRESENTATIONS

We organized a number of presentations by industry leaders and funding agencies to help shape early exploratory pathways, align research with strategic opportunities and maximize available funding. In October 2011, for example, we presented a talk from NRCan's Dr. Eddy Chui on next-generation carbon capture and storage.

► ELECTRIC VEHICLE MIXER

WISE partnered with the Engineering Research Office and NSERC to host a researcher/industry mixer event focused on electric vehicles and the grid. The informal evening event saw 11 University of Waterloo faculty and a wide range of industry representatives explore research interests and opportunities for collaboration.

► ELECTRIC VEHICLE TEST DRIVE

WISE hosted a two-day electric vehicle test drive event in partnership with Mitsubishi. Our aim was to engage with the local community and elicit their input into the design of our Drive4Data initiative. The event was highly successful, attracting local utilities, municipalities and the high-tech sector. A large majority of participants indicated they would be willing to share their electric vehicle data with WISE, while 30 per cent indicated they would like to be directly involved in advancing the initiative.

LAURA FORMUSA
President and CEO, Hydro One Inc.

"The scale and range of energy research at WISE is impressive. Hydro One values its partnership with Waterloo as it not only provides Hydro One and the electricity sector with solutions to technical challenges, but it also provides faculty members and students the opportunity to research and publish meaningful and relevant studies."

TAKESHI ENOWAKI
Deputy General Manager,
Mitsui & Co. (Canada)

"WISE inspires the creation of social and economic value and helps companies like ours achieve a model of green revolution in the electric vehicle industry."

DEVELOPING NEW PARTNERSHIPS

Each week, we advise our members about partner opportunities via the members-only section of our website, and we post funding opportunities that are open to the public. In the public section of our website, we also post opportunities on behalf of WISE researchers looking for industry partners and funding.

In 2011/12, these efforts paid off with 11 new partnerships. They include:

► MAHINDRA SATYAM

WISE teamed up with this multinational systems integration company to advance a smart grid research and innovation centre at the University of Waterloo and launch global training programs (starting in India).

► MITSUI & CO. LTD.

WISE partnered with Mitsui on a $0.5M proposal to the global Mitsui Environment Fund (ranked #1 in North America) relating to lifecycle battery management.

► GREATER TORONTO AIRPORT AUTHORITY

In June 2011, GTAA approached WISE to help them reduce the global warming footprint of their operations and meet their ambitious emissions targets. In turn, WISE partnered with The Delphi Group to develop a strategic roadmap, providing GTAA the information they needed to prioritize action and move forward with implementation.

ENHANCING EXISTING PARTNERSHIPS

While we actively pursue new partnerships, we continue to enhance the dozens of partnerships we have already established. These include:

► UNION GAS LIMITED

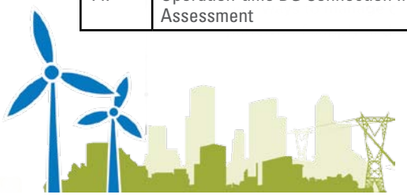
Together with Union Gas, we're defining the concept of "Smart Energy Networks." A 149-page report by WISE members John Wen, Daniel Chai, Jatin Nathwani and Ian Rowlands describes the potential of these networks to lead market transformation in the natural gas industry. Union Gas provided $18,000 to support this research, including a $10,000 Centennial Grant award.

► HYDRO ONE

In 2009, we signed a five-year memorandum of understanding with Hydro One, which included an endowed chair (currently filled by Dr. Claudio Cañizares) and $1M in research funding. Since then, Hydro One has committed an additional $210,000 in funding and in-kind support. In 2011, four new Hydro One projects were approved, bringing the total to 14. WISE members have made the most of that investment, using the Hydro One dollars to leverage an additional $3M in research funding. Much of that comes from established funding agencies such as NSERC and OCE. An additional $2M is anticipated based on funding applications in the pipeline.

HYDRO ONE FUNDED PROJECTS (2009 – PRESENT)

	PROJECT	PI
1.	Peer-to-Peer communications for distributed energy generation and storage	Keshav, S
2.	Non-destructive condition assessment of wood poles using ultrasonic waves	Cascanti, G
3.	Increasing Renewable Generation Connectivity in the Transmission System of Ontario through use of Innovative DG Controls	Salama, M
4.	Voltage Waveforms Effects on Power System Insulation under High Frequency and Fast Transients	Jayaram, S
5.	Energy Education in the North: Literature Review, Design Features and Unit Plans	Parker, P
6.	Dynamic Interactions in Active Distribution Systems: Modeling, Analysis and Suppression via Control Design	Salama, M
7.	Using Smart Grid Technologies to Reduce Production Costs and Increase Access to Renewable Energy In Power Systems	Cañizares, C
8.	Distributed Generation Multiagent Voltage and Reactive Power Control Under Smart Grid Applications	El-Saadany, E
9.	Developing a Stabilizing Control for Microgrid systems	El-Saadany, E
10.	Operation, communications and information management for smart electricity grids	Bhattacharya, K
11.	Probabilistic planning and billing management	Rosenberg, C
12.	The Energy Hub Management System II: Empowering LDCs to Enable the Smart Grid	Cañizares, C
13.	Control Platform for Integration of Renewable Energy in Remote Communities	Cañizares, C
14.	Operation-time DG Connection Impact Assessment	Salama, M



MIKE MORRIS
Executive Director,
Sustainable Waterloo Region

"From our earliest days,WISE has been a trusted and active collaborator in the work of Sustainable Waterloo Region, from faculty participation on our Advisory Board to financial support for many of our University of Waterloo co-op students. This is an institute whose 'raison d'être' is its interconnectedness with local business, the citizen sector and the sustainability community."

PROF. AIPING YU
Assistant Professor,
Department of Chemical Engineering

"WISE is a bridge that connects the energy sector including government, industry and international partners directly with faculty at University of Waterloo. We all stand to benefit from WISE's efforts."

Over the past fiscal year, we partnered or collaborated with many organizations and pursued promising discussions with many more.

INFLUENCE

Our research shapes public attitudes, informs energy policies and improves quality of life at home and around the globe. By publicizing our work, organizing events and participating in important forums, we give governments, businesses and non-governmental organizations the information they need to advance new ideas and implement innovative concepts that benefit society as a whole.

INFORMING PUBLIC POLICY

By sitting on energy boards and engaging in industry forums, WISE brings evidence-based analysis to the governance and regulation of the energy sector. In the past year, for example, we participated in the Council for Clean and Reliable Electricity, the Ontario Smart Grid Forum and the Ontario Energy Board Chair's Advisory Roundtable for Industry. As a result, we helped to inform smart grid governance, the redesign of feed-in-tariffs, the global adjustment mechanism, technology choices for Ontario's next new nuclear plant, the Auditor General's report on Ontario's renewable energy program, governance models in the electricity sector and biomass energy opportunities.

DISSEMINATING RESEARCH

To maximize the impact of our members, we create exposure for their research results.

WISE LECTURE SERIES

Our series of lectures brought leading energy experts to WISE, giving our members and our wider community insights into key issues.

LOW CARBON GREEN TECHNOLOGIES FOR OFF GRID POWER GENERATION USING RENEWABLE ENERGY FOR DEVELOPING ECONOMIES TO ENERGIZE DISPERSED COMMUNITIES

Dr. S.S. Murthy
Department of Electrical Engineering
Indian Institute of Technology

SMARTER ENERGY: THE PROMISE OF CYBER-PHYSICAL SYSTEMS

Shivkumar Kalyanaraman
Senior Manager, Next Generation Systems & Smarter Planet Solutions Department, IBM
India Research Labs, Bangalore

ESTIMATING THE VOLATILITY OF WIND ENERGY FROM HIGH FREQUENCY DATA

John Boland
Environmental Mathematics, Barbara Hardy Institute, University of South Australia

ENERGY MOVES ME

Erin Woodrow
Senior Sustainability Advisor
Suncor Energy

CLIMATE CHANGE: THE CORPORATE AND COLLECTIVE RESPONSE

Michael Gerbis
CEO
The Delphi Group

DEMAND RESPONSIVE BUILDINGS: REDUCING ON-PEAK ELECTRICITY USE IN OFFICES AND HOUSES

Dr. Guy Newsham
Principal Research Officer
National Research Council Canada

GLEN WRIGHT
Chair, Council for Clean and Reliable Electricity (CCRE)

"WISE and Prof Nathwani remain instrumental in fostering CCRE's goals to promote reasoned analysis on subjects related to electricity policy and governance of the sector. The Institute is a welcome addition to increasing our capacity for innovation and made a significant positive contribution to change."

PAUL MURPHY
CEO of the Independent Electricity Operator (IESO) and Chair of the Ontario Smart Grid Forum

"WISE continues to play an important role in helping shape the evolution of Ontario's electricity system to meet challenging performance requirements in the future."

RESEARCH SPOTLIGHTS

Over the past year, we've produced nearly two dozen "Spotlights" on WISE research, showcasing the advances our members are making in everything from improving biofuel production to understanding the risks of carbon storage. (See page 28.) As a result, we've helped WISE researchers gain prominence with a wider audience, including policy and decision makers in government, business and industry.

Sample Research Spotlight:

HELLO SUNSHINE! INTEGRATING SOLAR FARMS WITH ONTARIO'S GRID

Harvesting energy from the sun is an attractive proposition. But when you convert solar energy into electricity on a large scale, as so-called "solar farms" aim to do, you run into a number of problems. These range from land use issues to the technical headaches of incorporating new electricity sources into our current grid. Investigators at UW, the University of Western Ontario, Hydro One and OptiSolar are finding solutions, thanks to an ambitious $4.5 million research collaboration.

Among the issues they're tackling is the fact that decentralized sources of electricity such as solar farms can create frequency and voltage problems when they're connected to the grid. Six professors from UW's electrical engineering department – Kankar Bhattacharya, Claudio Cañizares, Ehab El-Saadany, Mehrdad Kazerani, Magdy Salama and Siva Sivoththaman – are working to determine just how much photovoltaic (PV) electricity our current system can accommodate without damaging upstream transistors.

Kazerani and Salama are developing new technology to increase the solar farm efficiency by reducing the impact of the shading on the solar panel. Kazerani is also developing cost-effective technologies to convert the DC power produced by PV systems into the three-phase AC power required by the grid, while Salama is enhancing solar farm performance by developing a new technology to reduce the impact of harmonics generated from the power electronics devices connected to solar panels.

Meanwhile, Cañizares and Bhattacharya are developing investment and regulatory planning models, and performing stability impact studies on Ontario's grid. The result will be powerful tools to help Ontario attract and implement large scale private investment in renewable power generation.

Finally, fellow UW electrical engineer Siva Sivoththaman is developing novel technology to maximize the power output of PV cells using textured conductive oxide coatings and optically active coatings.

Together, these researchers are working to make large-scale PV generation a reality in Ontario, successfully integrating solar farms with our current transmission and distributions systems.

Researchers:

Magdy Salama
C. Cañizares
K. Bhattacharya
Ehab El-Saadany
Mehrdad Kazerani
Siva Sivoththaman
Rajiv Varma
T.S. Sidhu
A. Yazdani
J. Jiang
G. Mochopoulos
Leo W.M. Lau
H. Hangan
J. Galsworthy
Guy Holburn
Tima Bansal

Partners:

Hydro One Inc., OptiSolar Farms Canada, First Solar, London Hydro, Bluepower, and University of Western Ontario.

Results to date:

One spinoff company; commercialization activities in collaboration with Rosstech Signals Inc. and Hydro One; nine patents in North America, Europe and China

RESEARCH SPOTLIGHTS 2011 2012

BUILDING BETTER BATTERIES

BETTER BIOFUEL PRODUCTION METHODS

COLD CLIMATE HEAT PUMPS: MEETING THE CHALLENGE OF CANADIAN WINTERS

FOCUSED PULSED TECHNOLOGY: REDUCING THE COSTS OF TREATING WASTEWATER

FORECASTING SHORT-TERM ELECTRICITY PRICES

FROM SHORT CIRCUITS TO SMART CIRCUITS

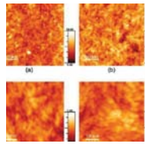
A GREENER, SMARTER ELECTRICITY GRID THANKS TO THE INTERNET

GOING UNDERGROUND: CO2 STORAGE IN AQUIFERS AND OTHER FORMATIONS

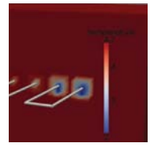
HELLO SUNSHINE! INTEGRATING SOLAR FARMS WITH ONTARIO'S GRID

HELPING REFINERIES REDUCE CO2 EMISSIONS

IMPROVING ORGANIC THIN-FILM TRANSISTORS



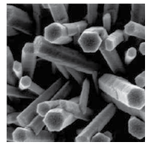
IN THE LOOP: IMPROVING GROUND LOOP HEAT EXCHANGERS



INTO THE VORTEX: INVESTIGATING FLOW OVER AIRFOILS AT LOW REYNOLDS NUMBERS

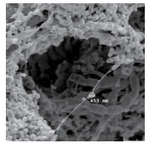
ON THE ROAD TO RENEWABLE ENERGY: CREATING ELECTRIC HIGHWAYS

REINVENTING THE SOLAR CELL



RETHINKING THE SCIENCE OF OZONE LOSS AND GLOBAL WARMING

REVVING UP MICROBIAL FUEL CELLS



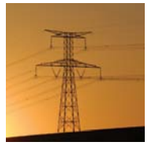
THE RIGHT FIT?

THE RISKS OF CAPTURING AND STORING CARBON

RISKY BUSINESS? ENVIRONMENTAL EXPOSURE AND THE BANKING INDUSTRY

SETTING GOALS FOR ENERGY CONSERVATION

SMARTER CALCULATIONS KEEP GRID COSTS DOWN



TAKING THE PULSE OF ELECTRICAL TRANSFORMERS

SHAPING THE CONVERSATION

Throughout the year, WISE participates in events that engage thought leaders and shape the direction of policy, research and industry. 2011/12 was no exception.

EQUINOX SUMMIT

WISE members were among the participants at June's Equinox Summit: Energy 2030, a five-day event designed to launch a new conversation about the world's energy future.

Organized by the Waterloo Global Science Initiative, it brought together scientists, advisors, policy makers and private-sector leaders from around the world to discuss realistic strategies for reducing our global carbon footprint.

"There is a compelling need to do the right things now to effect change in the 10 or 20 year timeframe that will ultimately transform the system," says WISE Executive Director Jatin Nathwani, who served as a scientific advisor to the Summit.

Other WISE member played key roles: Linda Nazar was a featured speaker, while Terri Boake served as a panelist on TVO's "The Agenda with Steve Paikin," taped live at the Summit.

One of the tangible results to emerge from the event was *Equinox Blueprint: Energy 2030*, an in-depth report detailing the energy challenges facing society, energy forecasts and visionary proposals to address the science and technology issues surrounding our energy future.

OCE DISCOVERY

WISE was out in force at OCE Discovery 2012, Canada's leading innovation-to-commercialization conference. Magdy Salama moderated a session on novel energy storage; Claudio Cañizares and Ian Rowlands were exhibitors at their Energy Hub Management System booth; and WISE as a whole had a booth. Meanwhile, WISE Executive Director Jatin Nathwani participated in the world's largest business mentoring event for entrepreneurs and innovators, helping to set a world record.

GLOBE 2012

WISE staff and members attended the Globe 2012 Conference, participating in discussions with energy and environment leaders on topics ranging from sustainable economies to carbon capture and storage. Dr. Blair Feltmate, an associate professor at the University of Waterloo and chair of Canada's Climate Change Adaptation Project was a panelist at the conference, helping lead discussion around Climate Adaptation: Building Resilience Through Risk Management & Insurance.

SING

WISE gave three University of Waterloo students – Andrew Northmore, Behnam Tamimi, and Indrajit Das – the opportunity to present their research to the Kitchener Solar Innovation Networking Group (SING) in March 2012. The trio discussed their work on solar highways, Ontario system studies and FIT modeling at the event, which brought together approximately 150 solar manufacturers, financiers and developers.

DAVID MCFADDEN, Q.C.
Partner and Chair, International,
Gowling Lafleur Henderson LLP
Member, WISE Advisory Council

"The Waterloo Institute for Sustainable Energy champions innovation through multidisciplinary research and effective partnerships with solution developers. In the march from innovative ideas to commercial enterprises, this will be a critical determining factor for Ontario's energy sector and its prosperity."

AMIR SHALABY
Vice President of Power System
Planning, Ontario Power Authority

"WISE has become a credible voice on sustainable energy policy. It earned respect in a short period of time by anchoring its advice on research, relevant data and sophisticated analysis. It provides perspective that is strengthened by academic independence, long-term thinking and rich practical experience. The institute is an asset to Ontario as it develops policies on complex issues."

MEMBER ACHIEVEMENTS

Not surprisingly, WISE members are making a significant contribution regionally, nationally and globally. We're proud of their many successes over the past year.

► **Linda Nazar** was elected to the Royal Society of Canada and received a 2011 Distinguished Woman in Chemistry or Chemical Engineering award for her work on lithium-air batteries. That same work earned her media coverage in IEEE Spectrum and CBC news.

► WISE Executive Director **Jatin Nathwani** contributed to several key energy reports, published an op-ed piece in the Globe and Mail on Ontario's energy policy agenda, appeared in TVO panel discussions on "The Agenda with Steve Paikin" and was quoted in the Financial Post. Nathwani was also a keynote speaker at a Commission for Environmental Cooperation public forum on renewable energy.

► Chemical Engineering's **Zhongwei Chen** received a prestigious $140,000 Ontario Early Researcher Award to fund his research on nanomaterials that could improve fuel-cell performance and reduce their cost.

► Chemical engineering professors **Leonardo Simon** and **Raymond Legge** are part of the new Ontario Biomaterials A-Team, a team of scientists helping Canadian companies bring innovative bioproducts to market faster.

► Systems design engineering professor **Keith Hipel** received the 2012 Japan Society for the Promotion of Science (JSPS) Eminent Scientist Award — the first time Japan's highest research prize for international scientists has been awarded to a Canadian.

► **Arthur Yip**, who was supervised by WISE Executive Director Jatin Nathwani, was part of a team of fourth-year students that took first place in the inaugural Walmart Green Student Challenge for their concept of an integrated energy hub for retail distribution centres.

► Another of Nathwani's students, **Helen Jiang**, was part of a team that took second prize in the Theoretical Competition — a three-hour exam of industrial engineering knowledge — at the Institute of Industrial Engineers' 2012 National Student Conference.

► **Susan Tighe** of civil and environmental engineering has become the new Norman W. McLeod Chair in Sustainable Pavement Engineering, a $1.5 million endowed chair launched by the Centre for Pavement and Transportation Technology.

► Piazza, a social learning network for students and instructors, named computer science professor **Srinivasan Keshav** Innovator of the Week for his innovative approach to teaching.

► A host of WISE members were among the faculty rewarded for their teaching and scholarship achievement through the University of Waterloo's outstanding performance fund in 2012: **Ali Elkamel** and **Christine Moresoli** of chemical engineering, **Terri Meyer Boake** of the school of architecture, and **Claudio Cañizares**, **Ehab El-Saadany** and **Magdy Salama** of electrical and computer engineering.

► Electrical and computer engineering professor **Catherine Rosenberg** became the new Canada Research Chair in the Future Internet — a position worth $5.6 million — and was also honoured with an Institute of Electrical and Electronics Engineers fellowship.

► School of Architecture professor **Philip Beesley**, whose Hylozoic Ground structure was Canada's entry at the 2010 Venice Biennale for Architecture, was honoured with a Royal Architectural Institute of Canada award for technical innovation in architecture practice.

► The American Society of Heating, Refrigeration and Air-Conditioning Engineers has given their prestigious Crosby Field Award to Waterloo mechanical and mechatronics engineering professors **Michael Collins** and **John Wright** for their work to improve the thermal performance of windows.

► Recent PhD grad **Kui Jiao**, former student of Xianguo Li, was chosen as the grand prize winner of the 2011 Dr. Bernard S. Baker Student Award for Fuel Cell Research, the first time a Canadian student has won the award. He was also one of five doctoral students campus-wide recognized for outstanding achievement in graduate studies.

► Chemical engineering professor **Flora Ng** won the 2011 Hikal Chemcon Distinguished Speaker Award, delivering an award lecture on catalytic distillation applications for the production of green fuel and chemicals.

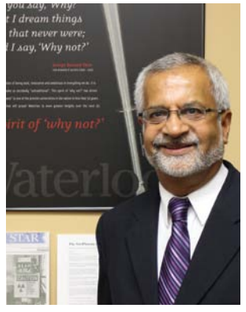
► **Wayne Parker** of civil and environmental engineering and his colleague Peter Huck have been recognized by Water Canada for their contributions to water research.

► **Apurva Narayan**, a doctoral candidate in Kumaraswamy Ponnambalam's systems design engineering lab, received the best paper award at the 35th National Systems Conference in India for his presentation on short-term load forecasting.

► **Garry Rempel**, a chemical engineering professor, received a Faculty of Engineering award for excellence in graduate supervision.

► **Robert Varin** of mechanical and mechatronics engineering earned a Science Technology Transfer Award from the World Association for Innovative Technologies for his keynote presentation on nanomaterials for solid-state hydrogen storage.

OUR PEOPLE



Executive Director

DR. JATIN NATHWANI

Professor Nathwani is the Ontario Research Chair in Public Policy for Sustainable Energy Management at the University of Waterloo, in the Faculty of Engineering and the Faculty of Environment. He is the lead scientific advisor to the Waterloo Global Science Initiative (WGSI) "Energy 2030", has been a key advisor to the Ontario Power Authority, and holds board memberships and directorships in several academic, industry and government organizations involved in energy policy and innovation.

Administration

Director

TRACEY FORREST

Tracey is responsible for the growth and strategic direction of the Institute, including all aspects of financial management, marketing, communications and partnership development. She builds multidisciplinary teams of researchers to conduct energy research and provide solutions that can be implemented by government, industry and civil society.

Manager, Scientific Outreach

DR. JOHN DÖMER

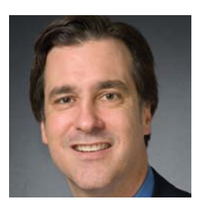
John oversees the creation and delivery of a wide variety of programs and projects specifically designed to support WISE's vision to be recognized internationally as a centre of excellence in sustainable energy research.

Administrative Assistant

IRIS STRICKLER

Iris oversees all daily administrative functions at WISE and is the primary point of contact for all administrative issues. She also serves as the assistant to the Executive Director.

Associate Directors



DR. IAN ROWLANDS

Associate Director, Global Initiatives
Professor
Environment & Resource Studies

DR. LINDA NAZAR

Associate Director, Research
Canada Research Chair in Solid State Materials
Professor
Department of Chemistry

DR. KANKAR BHATTACHARYA

Associate Director, Advanced Training
Professor
Department of Electrical and Computer Engineering

DR. CLAUDIO CAÑIZARES

Associate Director, External Partnerships
Endowed Chair, Hydro One
Professor
Department of Electrical and Computer Engineering

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Executive Vice President Strategy
Hydro One Inc

KEN KOZLIK
Energy Consultant

JOHN WILKINSON
Former Ontario Cabinet Minister

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Dr. Dipanjan Basu
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Dr. Kankar Bhattacharya
Dr. Philip Bigelow
Dr. Jason Blackstock
Prof. Terri Meyer Boake
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Dr. Claudio Cañizares
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