

Vision: Generating global respect for groundwater through field research.

Mission: Enable evidence-informed groundwater resource stewardship by providing a world class research institute of excellence for training and collaboration to advance knowledge, professional practice, and policy.

The **G³⁶⁰ Institute for Groundwater Research** conducts field-based groundwater research focused in 3 main areas:

- Aged industrial contaminated sites
- Groundwater resource characterization and monitoring for potable water supply and ecosystem protection.
- Potential impacts to surface water and groundwater from oil and gas development.

Founded at the University of Guelph in 2007 by Dr. Beth Parker, G³⁶⁰ follows a scientific approach that relies on comprehensive field data sets that are multi-disciplinary and high resolution for the formulation of process-based site conceptual models informing risk to receptors and subsurface remediation designs. Subsurface contaminants behave in a complex manner and necessitate the use of multidisciplinary data sets and multiple lines of evidence to account for natural variation and scientific uncertainty. Work on several long term field research stations has led to the development of the Discrete Fracture Network (DFN) Field approach for site characterization, monitoring and modeling which describes groundwater flow and contaminant transport and fate in heterogeneous sedimentary fractured bedrock aquifer and aquitard systems.



Who We Are:

The G³⁶⁰ Institute is comprised of 15 principal investigators and employs nearly 50 people including post-docs, research associates, graduate students, visiting scientists and technicians. G³⁶⁰ conducts research at established field research sites in Canada and USA, and has strong collaborations with field projects in Germany, Sweden, China, and Brazil. G³⁶⁰ established the Groundwater Discovery Center on the University of Guelph campus. This facility includes a large purpose-built building to house drilling, sampling and logging equipment, as well as a network of research boreholes and resources for technology demonstrations, knowledge transfer, teaching and community outreach. In addition, G³⁶⁰ manages a network of high resolution multilevel systems for groundwater monitoring and flow system research on campus and throughout the greater Guelph area so that the Guelph region serves as a model research community for many avenues of investigation. In association with the University Consortium for Field-Focused Groundwater Contamination Research, G³⁶⁰ is the focal point of a global collaboration of more than 20 institutions in 10 countries where principal investigators and research associates oversee projects and students supported by many industry and government sponsors contributing over \$4 million/year to the challenge.

Research Thrusts:

- High resolution groundwater resource characterization and monitoring, and technology innovation and development.
- Source water flow system protection, water resource management and risk analysis.
- Groundwater contaminant transport processes with emphasis on diffusion and advective interactions in heterogeneous systems.
- DNAPL source zone evolution and effects on plume behavior in fractured sedimentary rock.
- Aquitard integrity with respect to various contaminant type for source water protection and waste isolation.
- Innovative high resolution discrete fracture network / matrix field methodology (DFN-M) for site characterization, monitoring and process-based predictive modeling in fractured rock systems.
- Organic and inorganic contaminants, pathogens, bacteria and viruses.
- Potential impacts to surface water and groundwater from upstream unconventional oil and gas development.
- High resolution data acquisition, storage and analysis methods for informing site conceptual and numerical models.

The comprehensive groundwater research infrastructure and portfolio of research sites developed and assembled by G³⁶⁰ are built on the alignment of a clear vision within a strong collaborative framework and the successful acquisition of large collective funding from federal and provincial governments, municipalities and cities, industries in several commercial sectors. These exceptional conditions combine to create a unique experiential education and research program involving industry standard practice and innovation on both practical and fundamental topics. There are few other academic facilities for field-focused groundwater research and education comparable to G³⁶⁰ that exist anywhere in the world.

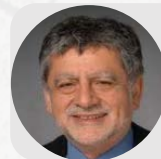
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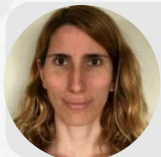
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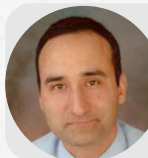
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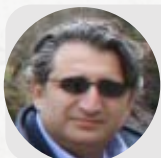
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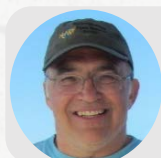
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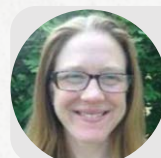
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SOE = School of Engineering, SES = School of Environmental Sciences

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G³⁶⁰ Sponsors / Partners / Supporters

