

## Big Ideas on the Boil: An Overview of the Vision and Significance of the MetaKettle Project

### Opportunity and Impact of the MetaKettle

The MetaKettle Project provides an innovative and strategic opportunity to place Memorial University among the forefront of universities in North America that are changing the way we educate engineers and scientists. The Project responds to several drivers towards change:

- Governments, industry, and universities recognize the need for engineers and scientists to exercise leadership in complex projects which require not only technical competence but which also demand an understanding of the social, cultural, economic, environmental, or ethical dimensions of the issues;
- Industry increasingly seeks employees with “T” shaped expertise, i.e. deep expertise in one discipline, together with the ability to collaborate effectively across a breadth of areas;
- Professional licensing associations, such as the Canadian Engineering Accreditation Board, now require that university graduates hone their technical and process skills in terms of outcomes-based measurements;
- Students of the millennial generation are seeking relevance in their education, not just for immediate career opportunities but for consistency with their life aspirations, including a sense of meaning and connection with their inner values and motivations, and with the global community.

The MetaKettle Project at Memorial University intends to meet these drivers for change that call for higher education and professional training to be more integrative, broad-based, and socially responsible. The MetaKettle seeks to distinguish itself as a key agent in brewing this “holistic advantage” by capitalizing on the emerging sea-change that is set to transform 21<sup>st</sup> Century engineering and science education in North America. A focus on leadership, interdisciplinary dialogue, sustainability, and collaboration ensures that the MetaKettle will foster not just successful university graduates, but engaged global citizens.

The MetaKettle is actively cultivating a network of forward-thinking collaborators across the university, as well as across the country and in the United States. Memorial University’s history of excellence in science and engineering education as well as its unique position as the sole university of Newfoundland and Labrador will heighten the MetaKettle’s influence not just within the province but within Canada, and indeed within North America.

## Our Vision for the MetaKettle Project

Our vision is that the MetaKettle Project will grow into a cross-faculty hub which will incubate, foster, and implement initiatives that will not only transform engineering and science education at Memorial University but furthermore set a benchmark for innovative and integrative teaching and learning in higher education.

In its initial stages, the MetaKettle Project will run cross-disciplinary programs and contribute to disciplinary offerings in the Faculty of Engineering and Applied Science and in the Faculty of Science. It will provide comprehensive methodological and curriculum support to professors and administrators in both Faculties who are engaged in upgrading course delivery to reflect a more integrative approach.

However, the MetaKettle Project is interested not just in curricular development but also in cultivating transformative educational environments. While maintaining high standards for technical proficiency and rigorous scientific inquiry, the MetaKettle seeks to attract not only those who excel in traditional science and engineering environments, but also those with a flare for the unconventional, who want to use their skills to sow seeds for social innovation. Providing a welcoming and accessible centre for dialogue across academic disciplines and into the community, the MetaKettle will therefore conduct collaborative research projects with social innovators and track transformative outcomes in our engineering and science programs.

In its full form, the MetaKettle Project would be co-directed by an Executive Director and a MetaKettle Professor. The MetaKettle Professor would be a senior level permanent position equivalent to a research chair, held by a professor of engineering or science who would have a strong research and teaching background in his or her home discipline as well as expertise and credentials in the discipline of engineering education or science education. The Project would welcome other professors or postdoctoral fellows to work from the MetaKettle for finite terms, on leave or secondment from their academic units at Memorial or at other universities, or on fellowships offered by the MetaKettle. The MetaKettle would employ other staff members who would conduct internally- and externally-funded research projects, and who would assist in MetaKettle program offerings and in the general operations of the MetaKettle. The MetaKettle Project would be amply housed in centrally located space on campus with a welcoming ambiance.

## The MetaKettle Version 1.0

The complexity of pressing and global challenges towards which scientific and engineering enterprises orient themselves suggests that universities need to transform educational processes to foster wider scientific and technological literacy, to educate deeper and more creative thinkers and designers, and to develop and embrace methods for multidisciplinary collaboration. The MetaKettle Project seeks to provide something for all students taking engineering and science courses at Memorial from their very first contact with the university. In the spirit of meeting students where they are, the MetaKettle will engage students across a wide spectrum of capacities, interests, and stages of growth in order to help them delve more fully into new challenges. Accordingly, we suggest a multi-faceted approach that starts with a two-year Pilot Program over 2011-2013, consisting of the following elements:

- An immersive and experiential summer Leadership and Dialogue institute in 2011, of either a two-week or four-week duration, based on, or in collaboration with, the Simon Fraser University “Undergraduate Semester in Dialogue” program. (This institute is envisaged to grow into a full-semester offering after the pilot period, potentially to be offered multiple times per year.)
- Teaching modules on “How to Think About Science” which can be incorporated into first year undergraduate science courses.
- Teaching modules in Engineering One which focus on the global role of engineering with an emphasis on experiential leadership, service-based learning, and dialogue.
- A seminar module or course for graduate students, extended from the CWSEA workshop “The Graduate Student Leader.” Such a course would include theories and practices of critical thinking in engineering and science, with applications to leadership in research, teaching, policy development, etc.
- Other elements selected from a longer list of potential activities (seminars, focus groups, workshops, scientific cafés, etc.) to announce the MetaKettle to the wider academic community and to witness to the big ideas being brewed both at Memorial University and beyond. These elements will focus on community engagement, technological and scientific literacy, interdisciplinary collaboration, and effective communication.

## The MetaKettle Name and Context

Kettles are enduring designs and artifacts from antiquity. They are eminently practical—whether they boil water domestically for tea or process chemicals industrially in science labs and manufacturing plants—and yet they also symbolize human productivity and ingenuity, embodying our natural bent to discover and create. So too the MetaKettle is both practical and innovative, offering a pragmatic response to a rapidly changing world and an integrative perspective on higher education.

Some of the best plans are hatched over a steaming mug, and the MetaKettle is intent upon brewing big picture thinking about engineering and science education. That big picture includes not just the “what” and “how” of doing engineering and science, but also the dynamic “who” and “why” of the person who aspires to be an engineer or scientist. The MetaKettle Project taps into the motivations and values which students bring to their study and work in engineering and science, including an emerging sense of themselves as citizens engaged in understanding and meeting the complex challenges of our times, both locally and globally.

The MetaKettle Project was initiated in June 2010 by Dr. Cecilia Moloney as a legacy of the NSERC/Petro-Canada Chair for Women in Science and Engineering, Atlantic Region, 2004–2009 (CWSEA). Building upon the mandate of the CWSEA to increase the participation of women in science and engineering, the MetaKettle Project extends the CWSEA goals: it aims to increase the diversity of students studying science and engineering, while enhancing the long-term sustainability of graduates over their careers and lives.

## More Information

For more about the MetaKettle Project or to get involved, contact us:

Dr. Janna Rosales, email: [jrosales@mun.ca](mailto:jrosales@mun.ca), tel: 709-864-7960

Dr. Cecilia Moloney, email: [cmoloney@mun.ca](mailto:cmoloney@mun.ca), tel: 709-864-8961

Faculty of Engineering and Applied Science  
Memorial University of Canada  
St. John's, NL A1B 3X5

Date: October 29, 2010