Advancing Inclusion in STEM

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Changing the face of STEM in Atlantic Canada through Equity, Diversity and Inclusion

Evolution of NSERC Chairs for Women in Science and Engineering (CWSE) with a goal of increased inclusion for equity-deserving groups across multiple intersecting dimensions
CISE-Atlantic Initiatives 2024

Recruitment, Retention, Talent Development

1.1 Retreats
1.2 ACT Conference
1.3 Physics in Rural Classrooms
1.4 Curriculum Development
1.5 Camps
1.6 Catalyze and Facilitate

1.7 Scholar Employment
1.8 L’nu Health CBU Unama’ki College
1.9 Inclusive Speaker Roster Development
1.10 Total Solar Eclipse 2024
CISE-Atlantic Initiatives 2024

Policy & Systemic Changes Through Connection Building

2.1 K-12 EDUCATION POLICY
2.2 OUTREACH IN TENURE AND PROMOTION
2.3 SCIENCE FAIR STRUCTURE POLICY
2.4 PROMISING PRACTICES (PP) DATABASE

Research & Dissemination

3.1 EVALUATION IN STEM OUTREACH
3.2 CAREER CHOICES IN STEM
### NSERC STRATEGIC PILLARS

1. Support research excellence that strengthens Canada
2. Expand, diversify and nurture Canada’s talent pool
3. Translate discovery into impact
4. Mobilize knowledge on a global scale

Guides CISE-Atlantic’s Mission of Advancing Inclusion in STEM across K to 18+

#### 2, 3 Catalyze & Facilitate Partnerships
- Total Solar Eclipse (ages 5-18+)
- STEM Education Policy Partnership with Departments of Education (5-18)
- Science Fair Policy Examination
- Self-Evaluation Tools in STEM Outreach
- Study & Report on Career Choices between Physical Sciences and Engineering

#### 2, 3 Curriculum Development (11-18)
- CISE- A Camps (11-16)
- Physics in the Rural Classroom (12-18)
- Scholar Employment (14-18)
- L’nu Health Sci Advantage (15-17)
- CISE-A Retreats (12-18)

#### 2, 3 CISE-A Conferences and Science Fairs (12-18)

#### 2, 3, 4 National Roster of Speakers & Role Models (ages 18+)

#### 2, 3 Outreach in Tenure & Promotion Policy (ages 18+)

#### 1, 2, 3, 4 National Promising Practices Database (ages 18+)
Curriculum Development

Educational Content Diversification
Patience attracts happiness; it brings near that which is far.

Swahili
Culturally Relevant Pedagogy

Imhotep’s Legacy Academy After-School Program

Suite of STEM Lesson Plans
- Representation: Black Scientists and Engineers
- Ways of Thinking and Being: African Proverbs
- Curriculum: Nova Scotia Science and Mathematics

Garrett Morgan (1877-1963) was an African-American inventor who invented the “smoke hood”, which was an early version of a gas mask, a device that is used to protect humans from inhaling harmful gases.

Fireproof Paper and a Magnetic Heat Engine
Imhotep’s Legacy Academy, Grade 8 Activity Plan
August 2016.
Culturally Relevant Pedagogy

Library of resources for grades 6-12

Featuring women with intersecting identities

Top (L-R): Kumudu Jinadasa, Aerospace Engineer; Chanda Prescod-Weinstein, Theoretical Cosmologist
Gladys West, Mathematician; Bibha Chowduri, Particle Physicist

Bottom (L-R): Irene Uchida, Geneticist; Cornelia (Nel) Wieman, Chief Medical Officer FNHA, Psychiatrist
Jocelyn Bell Burnell, Astrophysicist; Laurie Rousseau-Nepton, Astronomer
Culturally Relevant Pedagogy

Co-development through relationship-building with community leaders, partners and EECD

Teachings and learning experiences together with **culturally relevant reference frames**, like Two-Eyed Seeing (Etuaptmumk)

**Transforming Classrooms, Changing Minds**

Mi’kmaw Moons, Ecological Cycle; Mi’kmaq Elders in conjunction with CBU Canada Research Chair in Integrative Science team
UNESCO Land as teacher: understanding Indigenous land-based education, Spruce Design
Jafar Ibn Muhammad Abu Mashar al-Balkhi, known as Abu Mashar. De magnis conjunctionibus (On great conjunctions)
Outreach in Tenure & Promotion
Transforming Systems
How can we incorporate EDI into Tenure & Promotion Processes to create systemic change?
#2
What are the implications of including community outreach into Tenure & Promotion Processes?
Dalhousie University’s Faculty of Science Tenure & Promotion Taskforce

Recommendation prioritize equity, diversity, inclusion, and accessibility (EDIA) considerations, structured into three key categories:

- Research
- Teaching
- Service
Research

- Multifaceted Evaluation Approach
- Diverse Forms of Scholarship
- Balanced Local and Global Impact
- Peer Review for Non-Traditional Impacts
Enhanced Teaching Evaluation Practices

Move beyond reliance on student learning experience questionnaires (SLEQs)

Incorporate Holistic Evaluation of Teaching (HET) Policy using evidence from:

- Students
- Peers
- Self
Service

Recognition of service that supports Departmental, Faculty and University Values

Recognition of Non-Traditional Activities
• Explicitly acknowledge and value non-traditional scholarly activities such as advocacy, outreach, and mentoring.
Call to Action
to value what is being undervalued
Physics in the Rural Classroom

Addressing barriers to access to Physics and STEM fields for rural and remote communities in the Atlantic
Atlantic Canada: Rural & Remote Realities

Census data has shown that 44% of the Atlantic’s residents live in rural communities.

2021 data shows Prince Edward Island and New Brunswick with the highest rural shares among the provinces.
Atlantic Canada: Rural & Remote Realities

Rural Distribution of 52 Historical African Nova Scotian Communities
Atlantic Canada: Rural & Remote Realities

Many rural northern communities are geographically isolated,

- Limiting access to educational resources, demonstration materials
- Limiting classroom, school funding
- Prevalence of teaching out-of-field.

Many coastal communities can only be accessed by plane or boat, sea-ice permitting
Program Structure

Partner organizations will nominate volunteers with expertise in physical sciences, engineering and technology to join classes online, role models from Equity-Deserving Groups.

Through collaboration with Atlantic teachers, learning experiences to be developed will be curriculum-connected, referring to regional priorities and including Indigenous knowledges.

Four online sessions will address specific curriculum per year for each grade which means each learner will engage with 24 different units through Grades 7 to 11.
PHYSICS IN RURAL CLASSROOMS

Community Engagement: Oct. 25th 2024
Launch: JANUARY 2025

Connecting schools and learners from rural and remote communities to STEM role models
Delivering high quality curriculum-connected learning experiences in Science and Physics for Grades 7-12

STEM ROLE MODELS
Database of Professionals working in STEM
Deliver the curated learning experiences virtually
Provide assistance to teachers with concepts in science and physics that have been sticking points
Speak to careers in STEM and their personal journeys

LEARNING EXPERIENCES
Database of Curriculum-Connected Learning Experiences
Associated materials and resources will be provided to teachers and schools
Provincial pedagogical standards will be followed

TEACHER ADVISORY GROUP
Teachers representing each Atlantic province
Provides guidance on needs for teachers, particularly those teaching out-of-field
Assists with curation of learning experiences and ensuring that they are appropriate by grade-level and province
#1
What are some barriers to engagement that should be considered for STEM Role Models?
#2
What are some possible solutions to those barriers?
#3
How do you see the wider Physics community supporting this program?
Questions & Discussions

Thank you!