

November 27, 2023

Dear Members of the Awards Committee of the CSEG

DR. HELEN ISAAC – NOMINEE FOR 2023 ROY O. LINDSETH CSEG MEDAL

It is our pleasure to nominate Dr. Helen Isaac as a most worthy candidate for the 2023 Roy O. Lindseth CSEG Medal. Helen has made significant contributions to the geophysical profession on technical topics, mentoring and in geoscience education & outreach.

TECHNICAL CONTRIBUTIONS

Helen worked in industry from 1974 to 1992 as an exploration geophysicist with several companies. In 1992 she decided to return to academia and she undertook a Ph.D. at the University of Calgary, completing her degree in 1996. Her Ph.D. research was one of the first applications of using time-lapse seismic data to enhance and better understand oilsands production, and she later published this work.

From 1996 to the present, Helen has worked tirelessly as a researcher, author, mentor, instructor and colleague within two research consortia at the University of Calgary - the Consortium for Research in Elastic Wave Exploration Seismology (CREWES) and the Fold-fault Research Project (FRP). In her position as a Research Associate, Helen developed a high level of expertise in seismic imaging of complex structures and in the improved imaging of multicomponent seismic data. In particular she has been an industry pioneer in developing flows for processing converted wave (PS) seismic data. She has presented and published extensively on this work in *Geophysics*, *The Leading Edge*, *Interpretation*, *Journal of Geophysical Research*, *CSEG Journal*, *CSPG Bulletin* and *The Recorder*. A list of many of Helen's key publications and abstracts are included in the Appendix to this letter; she was a key contributor to the research outputs discussed in all of these publications. She also was an author and co-author of a large number of research reports provided to CREWES and FRP industry sponsors and she always was instrumental in helping to organize annual general meetings of these consortia.

In addition to her technical contributions, Helen was and still is heavily engaged in mentoring and helping graduate students and other researchers at the University of Calgary. One specific valuable contribution that she made was a pragmatic workbook on how to use Promax™ for processing seismic data. This workbook has been used by many graduate students as well as staff, and Helen is the go-to person to help graduate students process their seismic data. She also contributed many guest lectures on exploration and development geophysics to undergraduate students at the University of Calgary. Helen's awareness of equity, diversity and inclusion was founded early in her career and she has been a tremendous mentor to female and international graduate students within both CREWES and FRP.

CSEG AND CSEG FOUNDATION SERVICE

Helen has been very active in the CSEG community for more than 25 years.

1996+	Volunteer (most years), GeoConvention technical committee and session chair
1999-2000	Second Vice-President, CSEG Executive
2000-2001	Director of Educational Services, CSEG Executive
SEG2000	Technical committee
2002 – 2007	Technical Editor RECORDER, CSEG
2001 – 2014	Outreach, CSEG and CSEG Foundation (Chair from 2003 to 2008)
2004 – 2018	Volunteer, Seismic in Motion and Seismic in Motion for Students
2006 – 2009	Volunteer, Kids in Science Program
2010 – present	Volunteer and Program Delivery Chair, Earth Science for Society (under CSEG Foundation since 2016)
2014 – 2018	Communications Chair, CSEG Foundation Board of Directors

GEOSCIENCE OUTREACH AND EDUCATION

Helen joined the CSEG Outreach committee in 2001 and became Chair in 2003. With CSEG Past Presidents and a group of dedicated volunteers, she helped launch a new and active Outreach committee. Helen sourced and managed funding, developed and compiled educational resources, developed presentation materials, recruited and coordinated a diverse group of volunteers, and expanded activities to include career fairs, in-school presentations, university events, and other educational and outreach activities. Helen herself also attended many career fairs and made countless presentations, enthusiastically engaging with young people. Under Helen's leadership, the Outreach committee became one of the CSEG's flagship initiatives for our membership, the public, and to students across Canada. Helen was Chair of the Outreach committee from 2003 to 2008 and continued to volunteer for 6 more years.

Helen was involved with CAGC's Seismic in Motion field trip since its inception. Visitors from industry, academia, regulatory agencies, and high school students were provided with an overview of seismic acquisition at multiple stations in one location. She led groups, put together PowerPoint presentations and manned the CSEG station in the tent, providing context for everything that participants saw over the course of the day. This event ran from about 2004 to 2018 and educated up to 150 attendees per year.

From 2006-2009, Helen volunteered on the Kids in Science Program (KISP) as a guide and on the organizing committee. KISP was the precursor to the Earth Science for Society (ESfS) exhibition. About 150 students each year spent the morning on the GeoConvention exhibit floor and the afternoon on geoscience activities.

Since the first Earth Science for Society (ESfS) exhibition at GeoCanada 2010 and in her role as Program Delivery Chair, Helen has organized the visits to ESfS of over 15,000 grade school students, guides, brownies, scouts and cubs. Earth Science for Society (ESfS) is a three-day geoscience outreach event in which students, families, youth groups, and the public are given an opportunity to explore the wonders of Earth science through hands-on exhibits. Through Helen's efforts, ESfS has developed excellent connections with educators and youth group leaders. Helen developed and is continuously improving the Scavenger Hunt Booklet that is used by all K-12 visitors to encourage engagement with exhibitors. She provides teachers and leaders with the Answer Key

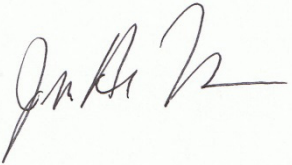
as well as relevant educator resources that enhance young people's experience and their science literacy. Helen is instrumental in ensuring K-12 youth and the public are exposed to various aspects of Earth science in a fun, educational and interactive way, are informed about education and career options, see how Earth science plays a critical role in our society, and make the connection between responsible resource development and the things we depend on every day.

Helen's work in the area of geophysics education has earned her the respect of everyone with whom she volunteers.

SUMMARY

We believe that Helen's long-term contributions and exemplary service have brought immeasurable benefit to both the CSEG and those interested in geoscience. She is a highly deserving candidate for the Roy O. Lindseth CSEG Medal. Please accept our recommendation for Helen for this award.

Submitted by:



Annette Milbradt, P.Geoph., FGC, retired Geophysicist; Past Chair, CSEG Foundation Outreach; Past Chair, Earth Science for Society (ESfS); geoscience outreach volunteer



Don Lawton, Ph.D., P.Geoph., FGC, Scientific Director, Carbon Management Canada; Professor Emeritus, University of Calgary

This nomination is also supported by:

Rachel Newrick, PhD., P, Geoph., P. Geol., FGC, Geophysicist and Instructor; Past President, CSEG; Past President, Canadian Federation of Earth Sciences Exploration

Marissa Whittaker, P.Geoph., Geophysicist; Past Chair, Earth Science for Society (ESfS); Assistant Director, CSEG Member Services

Appendix

Dr. Helen Isaac publications (key papers and abstracts)

- J. Helen Isaac** and Don C. Lawton, 2014, A case history of experimental 3C-2D seismic reflection data for reservoir monitoring at Cold Lake, Alberta, Canada, *Interpretation*, 2, SE47-SE54.
- Isaac, H.J.**, D.C. Lawton and C.W. Langenburg, 2008. Seismic imaging of the Turtle Mountain structure, southwestern Alberta, *Bulletin of Canadian Petroleum Geology*, 56, 199-208.
- Isaac, H.J.** and Lawton, D.C. 2008. Seismic velocity model building for prestack depth migration of seismic data acquired in an area of complex geology in Southern Alberta, Canada: *Geophysics*, 73, VE255 – VE260.
- Lawton, D.C. and **Isaac, H.J.** 2007. Integrated gravity and seismic interpretation, Norman Range, Northwest Territories, Canada: *Geophysics*, 72, B117-B112.
- Isaac, J.H.** and Lawton, D.C. 2006. A case history of time-lapse 3D seismic surveys at Cold Lake, Alberta, Canada: *Geophysics*, 71, No. 4, B93-B99.
- Lawton, D.C. and **Isaac, H.J.** 2005. Geophysical evidence for thin-skinned structural deformation in the Norman Range, Northwest Territories: *Bulletin of Canadian Petroleum Geology*, 53, 200 - 209.
- Lawton, Don C., **J. Helen Isaac**, Robert W. Vestrum, and Jennifer M. Leslie. 2001. Slip-slidin' away – some practical implications of seismic velocity anisotropy on depth imaging. *The Leading Edge*, 20, 70-73.
- Isaac, J.H.**, and Lawton, D.C. 1999. Image mispositioning due to dipping TI media: A physical seismic modeling study, *Geophysics*, 64, 1230-1239.
- Kirtland Grech, M. G., **J.H. Isaac**, and D.C. Lawton. 1999. Comparison of structural imaging in anisotropic media using *P*-wave and *S*-wave data, *The Leading Edge*, September 1999. 1062-1066.
- Bobby Gunning, Donald Lawton, and **Helen Isaac**, 2016, A multicomponent 3D seismic data study from an oil sands field, Alberta, Canada. SEG Technical Program Expanded Abstracts 2016: pp. 1864-1868. doi: 10.1190/segam2016-13960523.1
- J. Helen Isaac**, Don C. Lawton, 2015, A little case study of offset-dependent synthetic seismogram responses; SEG Technical Program Expanded Abstracts 2015, 571-574.
- Gavotti, P., Lawton, D. C, Margrave, G and **Isaac, J. H**; June 2013, Model-Based Inversion of Low-Frequency Seismic Data:75th EAGE Conference & Exhibition incorporating SPE EUROPEC 2013, London, United Kingdom.
- Gavotti, P., Lawton, D. C, Margrave, G and **Isaac, J. H**; September 2013, Post-stack inversion of broadband seismic data from Alberta, Canada: 2013 SEG International Exposition and 83rd Annual Meeting, Houston, USA.
- Alshuhail, Abdullah A., Don C. Lawton and **Helen J. Isaac**, 2011. Geophysical characterization of the Devonian Nisku Formation for the Wabamun Area CO2 Sequestration Project (WASP), Alberta, Canada. 10th International Conference on Greenhouse Gas Control Technologies (GHGT-10), Amsterdam, Netherlands, September 19-23, 2010.

- Alshuhail, Abdullah, Don Lawton and **Helen Isaac**. 2010. Seismic characterization of the Nisku Formation in the Wabamun area, Alberta, Canada for large-scale CO2 sequestration. SEG Denver 2010 Annual Meeting, September 30-October 9, 2010.
- Isaac, Helen** and Don C. Lawton, 2009. Seismic velocity model building in an area of complex geology, Southern Alberta, Canada, American Association of Petroleum Geologists Annual meeting, Denver, Colorado, June 7-10, 2009
- J. Helen Isaac** and Don C. Lawton, 2007. Interpretive velocity model-building for seismic data acquired across a complex structure in Southern Alberta, Canada, Society of Exploration Geophysicists Expanded Abstracts, 26, 1, 902-906.
- Moubarak. H., Bancroft, J., Lawton D., **Isaac, H**, Mewhort, L., Emery, D., and Scott, B., 2007. A modeling study for imaging structurally complex media: a case history, 7th Annual International Meeting, Society of Explorational Geophysicists, 2002-2005.
- Isaac, J.H.**, and Lawton, D.C. 2000. A new method for the estimation of anisotropy parameters from surface P-wave seismic data: 70th Annual International Meeting: Society of Explorational Geophysicists, 2233-2236.
- Grech, M. G. K., **Isaac, J. H.** and Lawton, D. C., 1998. Comparison of imaging in anisotropic media using P-wave and S-wave data., 68th Ann. Internat. Mtg: Soc. of Expl. Geophys., 1665-1668.
- Isaac, J. H.** and Lawton, D. C., 1994. 3-D and multicomponent seismic methods for reservoir monitoring, 64th Ann. Internat. Mtg: Soc. of Expl. Geophys., 281-283