December 20th, 2018

Nomination of Professor Damian Nance: Gesner Medal, Atlantic Geoscience Society.

I am delighted to nominate **Damian Nance** (Ohio University) for the Gesner Medal. Damian has certainly "developed and promoted the advancement of geoscience in the Atlantic Region" and has made a contribution of "large enough scope to have made an impact beyond the immediate Atlantic Region". These contentions are strongly supported by letters from colleague and friends that are attached with this nomination.

Damian's research has been highly impressive both in terms of quality of publications and sustained productivity for nearly 40 years. This research has a common theme; the investigation of the natural forces responsible for mountain building. As you can see from his CV (attached), he has contributed to the geoscience community in many other ways, including editorial duties (e.g. a past editor of GSA Today; current science editor of Lithosphere). He has also trained several generations of students and by infecting them with his passion for structural geology and tectonics, his legacy is huge.

As a PhD student, Damian cut his teeth studying the ophiolites of Greece. He arrived in Canada in 1976 and launched into the understanding of the geological evolution of the Appalachians. Seminal papers by Tuzo Wilson 60s had shown that the Appalachians were key to evaluating whether plate tectonic principles could be extended back as far as the Early Paleozoic. Damian identified Avalonian rocks exposed in southern New Brunswick, essentially *terra incognita*, as a key area to test Wilson's models. In 1986, two landmark papers were published (GEOLOGY, Maritime Sediments and Atlantic Geology). The basic message was that the evolution of the Avalon terrane in New Brunswick recorded the opening and closing of the Iapetus Ocean, highlighting the strategic importance of New Brunswick geology in solving orogen-scale issues. This research provided the context for influential papers (with R.D. Dallmeyer) that combined kinematic field data with argon isotopic systematics to constrain the evolution of Avalon and adjacent terranes, as well as the timing and dynamics of movement on the faults between them.

In 1987, he published one of the very first papers documenting the existence of San-Andreas type faults in the Appalachians and used it to constrain the mechanisms by which the supercontinent Pangea amalgamated. His model was the first documentation of a "flower structure" in the Appalachians, formed when crust between two major faults is squeezed, exhumed and cannibalized by tectonic forces.

In 1987, Damian investigated Avalonian rocks in the Cobequid Highlands of Nova Scotia. He realized that these rocks were a local expression of global-scale mountain building activity that brought together a supercontinent some 600 million years ago. With this insight came the recognition of contrasting styles of mountain building; *interior orogens* related to collisional activity that brought the supercontinent together, and *peripheral orogens* along the edge of the supercontinent as subduction zones migrated from the interior to the periphery as the supercontinent amalgamated.

Using Avalonia as an example, in the mid 1990's Damian produced the first papers documenting the use of samarium-neodymium isotopic systematics as chemical tracers to deduce the origin and tectonic transport of terranes. His 1994 paper published in GEOLOGY has been highly influential (300+ citations) and was invited to serve as co-editor on the 1996 publication of a GSA special paper on Avalonian and related terranes.

In terms of contribution beyond the Atlantic Region, Damian is perhaps best known for being the initial proposer (along with Tom Worsley and the late Judith Moody) of the Supercontinent Cycle hypothesis. They proposed that the cyclic assembly, amalgamation and fragmentation of supercontinents have been the first-order expression of tectonics for the past 2.5 billion years and that these processes profoundly influenced the evolution of the Earth's geosphere, hydrosphere, atmosphere and biosphere.

These basic concepts are now part of the mainstream of scientific debate, but in the early 1980's they were positively revolutionary. These papers are a classic contribution to international geoscience that will resonate for decades to come. Although the details will be long-debated, I believe that Damian will be recognized as the pioneer in the understanding of long-term tectonic cycles and their relationship to the evolution of the biosphere, hydrosphere and atmosphere.

Damian began field work in Mexico because he suspected a greater linkage to Appalachian geology than others have realized that could have first order implications for understanding the origin of Pangea. This research resulted in several highly cited review papers on the origin and evolution of the Rheic Ocean and on some of the geodynamic challenges in the amalgamation of Pangea. Typically, his evolving interest in the Pangean suture zones has led to provocative models that his beloved Cornwall may be underlain by crust more typical of the Meguma Terrane of Atlantic Canada.

Damian's research has contributed much more than fundamental ideas and concepts. His field work has shown how tectonic activity on a "local" scale can be connected to regional and global patterns, and in doing so, has bridged the conceptual gap between field-based research and the supercontinent cycle hypothesis. Students have been involved with his field work at every juncture, from New Brunswick and Nova Scotia in Atlantic Canada, to Oaxaca and Acatlán in Mexico, and most recently in Cornwall, U.K., and Donegal, Ireland. In training generations of students and infecting them with his passion for field-based structural geology and tectonics, his legacy is huge.

Damian's research career is now well into its fifth decade, and his publications are most impressive both in terms of quantity and quality. He has published in a wide variety of prestigious journals. He has contributed fundamental insights into forces responsible for the origin of mountains, and how these forces have changed through time.

Damian is an internationally-renowned geoscientist. He has made fundamental contributions to our understanding of the Geology of Atlantic Canada and has certainly made an impact beyond the immediate Atlantic region. His research has been a major influence on the theories of plate tectonics and global-scale geodynamics. He is an outstanding ambassador for our discipline and I enthusiastically nominate him for the Gesner Medal.

Sincerely,

Brendan Murphy

Professor, Earth Sciences,
St. Francis Xavier University