

**The 2005 W.A. Johnston Medallist**

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## THE 2005 W.A. JOHNSTON MEDALLIST



(Photograph by Stephen Wild; courtesy of Queen's University)

### JOHN P. SMOL

It is with great enthusiasm that we are nominating Dr. John P. Smol for CANQUA's W.A. Johnston Medal. We do so with the encouragement of a number of Canadian scientists who have heard John's invited seminars over the course of the years and who have read his numerous publications. Most recently, John was awarded the Natural Sciences and Engineering Research Council of Canada's (NSERC) Gerhard Herzberg Canada Gold Medal for Science and Engineering, Canada's highest honour for research excellence in science and engineering. It was presented in Ottawa on December 6, 2004, "...for his efforts in bringing paleolimnology to world attention, and for discoveries, innovative techniques and research protocols that are influencing public policy on issues related to climate change,

water pollution and the protection of the Arctic environment". This is only one of the many honours and recognition that have been awarded to John.

John is qualified to receive this medal according to all four listed criteria. The first two are by default, as John was born in Canada and has always lived, studied and worked in the country that he loves and is proud of. But it is the last two criteria that truly make John a strong candidate for this medal. A great part of his paleolimnological and paleoclimatological research has been conducted in Canada and secondly, he has trained and supervised numerous students (over 50 graduate students, including 24 Ph.D. students!) who also mostly conduct their research in Canada.

John's university education began at McGill University where he received a B.Sc. in marine biology. His limnology professors, Prof. J. Kalff for one, sparked his interest in lakes and paleolimnology and this was enough to ensure that John pursued this interest. For his M.Sc. research at Brock University, John used diatoms to study the paleolimnological record of Precambrian Shield lakes. It was during this research that John first encountered strange, unidentified siliceous microfossils in the sediments of the lakes that he was examining. These were clearly not diatoms, but they were sufficiently numerous and varied to peak his interest. With great determination, he set out to identify what would eventually become an exciting new microfossil, so useful in paleolimnological studies. It took awhile, but eventually he identified these strange shapes as chrysophyte scales. Up until John's discovery, scant attention had been paid to them as it was thought that they would not preserve in lake sediments. John went on to describe this new group of paleoindicators and their uses. Less than five years later, this was to become an important microfossil in lake acidification studies as well as paleoclimatic reconstructions. After completing his M.Sc. in record time, John went to study with Dr. S.R. Brown at Queen's University. An established researcher, who had designed corers, worked with fossil algal pigments, the choice to work with Ted Brown was probably the smartest choice that John could have made. Encouraged to continue his paleolimnological research on Chrysophytes and diatoms, John worked independently and continuously on what was to become his life-long passion: lake sediments. To some people, this might be regarded as "mud" but to John it was a means to discovering the environmental history of a region. Not only could "secrets of the past" be uncovered, but they could be quantified by applying transfer functions. These resulted in useful paleoenvironmental reconstructions that were of interest to lake managers and paleoclimate modelers. When John Smol first came to the paleolimnology scene, it was basically in its infancy. There was so much more to develop and learn. John did so with his enthusiasm and his wonderful ability to work with so many different collaborators.

Upon completion of his graduate work, John worked at the Geological Survey of Canada on an NSERC Postdoctoral Fellowship. It was Dr. W. Blake, Jr. who first introduced John to Arctic research, and this has continued to be a major focus of his research to date. Soon after, in 1984, John was appointed to the faculty of the Biology Department at Queen's University in Kingston, Ontario. John's promotion to full professor was meteoric as he accelerated through the system in seven years. In January 2001, John was appointed the Canada Research Chair in Environmental Change. This is amongst the first of the Canada Research Chairs that were awarded. Queen's acted immediately to put forward that nomination. Today John is 49 years old. He has supervised over 50 graduate students. The enthusiasm and dedication with which John lives and works is unsurpassed by any other researcher that we know.

As mentioned above, John has been instrumental in moving paleolimnology from a largely descriptive science to a quantitative science used to study water quality issues and paleo-environments. Upon appointment at Queen's, he founded the

Paleoecological Environmental Assessment and Research Laboratory (PEARL). This is a group of about 30 researchers, made of research associates, graduate students and technicians, all studying past environments. These projects range from the description of new bioindicators of environmental change such as lake acidification and eutrophication, to the effects of climate change on lake ecosystems. With his students and colleagues he is deciphering the past climates of the Arctic, determining the impacts of global pollution, as well as determining past salmon populations over the past 2000 years. Without paleolimnological techniques, these data could not be obtained. In the end, these various subdisciplines are integrated to produce a holistic reconstruction of paleoenvironmental change.

John's pre-eminence in science has been recognized many times. It began with the award (1990) of the E.W.R. Steacie Memorial Fellowship, the Natural Sciences and Engineering Research Council's highest award for young scientists or engineers. The Botanical Society of America awarded John their 1992 Darbaker Prize for his work on algae. In 1993, he was presented with the North American Lake Management Society (NALMS) research award for "outstanding research in lake restoration, protection and management". In 1993 he was also awarded the National Research Council's Steacie Prize, as Canada's most outstanding young scientist. John was elected a Fellow of the Arctic Institute of North America in 1993. In 1994, he received an award from the Atomic Energy of Canada, Ltd., and was presented with the Queen's University Prize for Excellence in Research. He was chosen by the Canadian Society of Limnologists as the 1995 Rigler Prize winner, and the Canada Council awarded him a Killam Fellowship (1995-1997). In 1996, he was elected a Fellow of the Royal Society of Canada, Academy of Sciences, as their youngest fellow. In 1997, he was presented with the University of Helsinki Award Medal, representing the field of physical geography, and the Geological Association of Canada's (GAC) Past-Presidents' Medal, for outstanding contributions to the geosciences. The GAC also elected him as one of their few Distinguished Fellows. In 1999, he was presented with the Turku Academia Medal. In 2000, he was named the Canada Research Chair in Environmental Change, and in 2001 he was presented with the Royal Society of Canada's Mirolsav Romanowski Medal (environment medal) for his work on limnology, and an Ontario Researcher of Distinction award. The year 2003 was big year as well: St Francis Xavier University bestowed an honorary LLD, the Royal Society of Canada awarded a certificate in appreciation for serving as Director of the Life Sciences Division, 2001-2003, NSERC recognized him with the Award of Excellence and Maclean's magazine listed him as a popular professor (2nd year running). These on their own are remarkable accomplishments; however, as mentioned in the opening paragraph, John has just received NSERC's top research prize, the Herzberg Gold Medal for Science and Engineering. This last award tops his NSERC research funding to \$1 million over 5 years.

Since 1980, he has authored over 300 peer-reviewed journal papers (including many in the big impact journals such as *Science*, *Nature* and *Proceedings of the National Academy of Sciences*), many book chapters, edited 15 books as well as a large number of technical reports and other publications, dealing with a suite of topics on limnology, paleolimnology, and global environmental change. Many of these books have a specialized scientific audience; however, his recent textbook, *Pollution of Lakes and Rivers: A Paleoenvironmental Perspective* (Oxford University Press) brings the science of paleolimnology and environmental change to a wider audience. He is the co-editor of numerous books and series, of which one series summarizes the myriad of new approaches available to paleolimnologists. He has authored over 500 conference presentations; many of these were invited and several were opening keynote addresses (e.g. American Society of Limnology and Oceanography (ASLO) 1993 keynote; Distinguished Phycology Lecture at the 1994 ASLO/Phycological Society of America (PSA) meeting; the 1995 Rigler Lecture at Society of Canadian Limnologists (SCL); keynote address at the recent (2002) international Drinking Water Conference, and many others). Of course all these numbers and statistics are out of date as soon as they are written, as John's tremendously proficient laboratory continues to publish papers on a weekly basis. Or so it would seem!

John's pre-eminence in science is recognized worldwide. At the age of 30, he was asked to be founding editor of the international *Journal of Paleolimnology*. This new, international, multi-disciplinary journal focussing on studies of long-term environmental change, began publishing in 1988. The journal is well past its 100th issue and has achieved a relatively high impact factor. He sits on numerous editorial boards and is generous with his time.

John's scientific research output as described above, is prodigious. He has been extremely successful in procuring research grants and is one of the highest funded Canadian researchers by NSERC. This dynamic researcher has received funding from a wide range of funding sources. Such funding success is fuelled by a successful publishing record. John's successes are due to his infectious enthusiasm. People want to work with him, due to his humour and his ability to put people at ease. He has inspired numerous students to follow in his footsteps and his laboratory, PEARL, is the frequent host to visiting sabbatical professors from Finland, Norway and the USA. John's legacy is being felt in numerous universities as his graduate students have been appointed to various faculties: Christie (Queen's University, Faculty of Education), Cumming (Queen's University, Biology), Doubleday (Carleton University, Environmental Studies), Douglas (University of Toronto, Geology), Hall (University of Waterloo, Biology), Moser (University of Western Ontario, Geography), Pienitz (Université Laval, Géographie), Quinlan (York University, Biology), Walker (Okanogan University College, Biology) and Zeeb (Royal Military College of Canada). Other students are employed as government research scientists, e.g., Paterson (Ministry of the Environment of Ontario).

John has served or serves on a large number of panels and review committees. For example, he has served on the NSERC strategic grant selection panel for Environmental Quality, on the Scientific Advisory Committee for the NSERC Joint Global Ocean Flux Study (JGOFS), on the steering committee for the National Science Foundation (NSF) Paleoclimates of Arctic Lakes and Estuaries (PALE) panel, the international steering committee of "LIMPACS" (Human Impact on Lake Ecosystems and

the Role of Palaeolimnology) as well as many other panels. John was elected (1996) to the Academy of Science, Royal Society of Canada and serves on many of their committees.

And so, it is with great pleasure that we nominate Dr. John P. Smol for the Johnston Medal. His accomplishments are many. He has inspired many students in the field of Quaternary environmental research. By linking neolimnology with paleolimnology, an important and integral part of our understanding of the Quaternary has been achieved.

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### ACCEPTANCE TEXT

It would be an understatement to say that I felt extremely honoured to have been chosen by CANQUA as the 2005 W.A. Johnston Medallist. I would like to extend my heart-felt thanks to Marianne Douglas, our new President, for leading this nomination, as well to Glen MacDonald, Bill Last, Ian Walker, and John England, who wrote the supporting letters. I would also like to thank the entire CANQUA community for this award.

I suppose the main feeling I had when I heard that I had won this prestigious award was that I was extremely grateful to have had the opportunity to work in an outstanding country, in an outstanding university, with outstanding colleagues and students, in an outstanding field. There really are no good excuses for not doing our best.

As many of you know, I am an enthusiast when it comes to paleolimnology. I am delighted to see how my field of research has been accepted by the Quaternary community, but also by many other disciplines, including fundamental and applied fields, such as those dealing with environmental assessments. It is also very humbling to look at the list of past winners of this award — some of whom I have worked with closely (such as Wes Blake); all of whom I have admired.

As with all such science awards, it is not really awarded to an individual, but to a group. Looking back at my career so far (I am not finished working yet!), I would certainly like to acknowledge my primary professors at McGill University, where I did my undergraduate work, and especially Jacob Kalff who instilled in me my scientific interest for lakes. My work in paleolimnology began at Brock University, while I was doing my Masters with Mike Dickman, and with a strong influence from the late Jaan Terasmae (himself a former Johnston Medallist). S.R. (Ted) Brown was a guiding influence as my Ph.D. supervisor. I must also especially acknowledge Wes Blake, Jr. (also a past W.A. Johnston Medallist), of the Geological Survey of Canada, without whom I am certain we would have never initiated our Arctic research programs.

A special thanks also to Marianne Douglas (professor in the Department of Geology at the University of Toronto, and the recent recipient of the Tier 1 Canada Research Chair in Global Change), who has been leading expeditions with me to the High Arctic for 20 years. I thank her for her ideas, insights, hard work, and above all, her friendship. Sincerest thanks are also due to my co-editor at the *Journal of Paleolimnology*, Bill Last at the University of Manitoba. Working with him has always been a pleasure and an inspiration. My family and friends have always been supportive. For example, I have the pleasure of working with my little brother, Jules Blais, who is a professor at the University of Ottawa and also works in a similar field to mine.

Most of all, I have to acknowledge present and past colleagues from my laboratory, the Paleoecological Environmental Assessment and Research Laboratory (PEARL). A truly remarkable group of dedicated and excellent scientists, and most importantly, all good friends. It is easy to do science and have fun when your primary colleagues consist of a continuous stream of truly outstanding students. And it is certainly rewarding to see our graduates all employed, and setting up their own dynamic research laboratories. I would especially, though, like to acknowledge my long-term colleague and friend, who co-directs the PEARL laboratory, Dr. Brian Cumming. Also, sincerest thanks to John Glew, who is my right hand (and frequently left hand as well) in the field and elsewhere, and has designed and built equipment used by paleolimnologists around the world. Other important support has come from technical staff, such as Fawn Ginn (who is now doing a Ph.D. at this university).

I feel a deep debt of gratitude to Queen's University and the Biology Department who had the courage, for lack of a better word, to hire someone (about 20 years ago to the day) who looked at stuff in mud and thought there might actually be something important here.

And of course, I have to thank the various funding agencies, such as for our Arctic work, the Polar Continental Shelf Project (PCSP), which remains a stellar example of how a government agency, on a low budget, can still deliver remarkable and essential resources to arctic research programs.

And finally, I have to acknowledge Science and Engineering Research Canada (NSERC). Unlike almost all other sources of funding, a professor in receipt of an NSERC Discovery grant has tremendous flexibility in determining how that money will be spent. We should never underestimate this advantage. We should never be lackadaisical in taking this funding structure for granted. Clearly, there is not enough money in the system. However, in my view, the NSERC Discovery grant program is almost a perfect fit with how real scientific discoveries happen. As I think everyone in this room knows, scientific discoveries happen when individuals get important and powerful ideas, and have the ability to see them through to completion. The ability to have a source of funding that allows you tremendous flexibility and latitude as to how you use that money — the only real condition being that it is sound scientific scholarship — means that we get a tremendous things done with our NSERC discovery grants.

If I look back at, say, the ten scientific contributions that I have been most proud of in my career to date, I don't think that I had anticipated a single one of these contributions in any of my NSERC proposals. Oh sure, all my proposals were in the general areas of these discoveries. I had proposed to work on lakes, and use lake sediments to track environmental changes — but at the time of writing my proposals, I could not have predicted where some of that research would go. I would get new ideas, new directions, would read something that would “re-orient” my course — all this happens in a period of five years. With an NSERC Discovery grant, I could re-align my research priorities, shift gears and change directions, and get answers. This would not be possible with more restrictive grants, which appear to be the norm in this world.

I think we should continue to keep supporting good scholarship, and we also have to stop worrying if it falls into an “applied” part of science, or a “basic” part of science. I see no reason to set up these ghettos in science. Good science is good science. Period.

I think my field of paleolimnology is an excellent example of how artificial or temporary the boundary is between so-called basic and applied research. When I was hired at Queen's in the mid-1980's, a major criticism of paleolimnology was that it was totally esoteric. Who really cares about how lakes develop over centuries and millennia? Then, all of a sudden, people realized they needed historical perspectives to answer questions such as “Have lakes changed as a result of human activities?” and “If so, when and by how much?”. Suddenly, in the blink of an eye, my research program switched from being classified as totally esoteric to totally applied! A good example, I think, showing that the main difference between fundamental and applied research is just a matter of time.

Certainly, it is wonderful to receive this reward from CANQUA, but there is little time to relax and much left to do. I have to say, with some sadness, that if you work in the environmental field, as I do, there is no shortage of work. As I look back the major subjects I have worked on over the last 20 years, it is a sad state of affairs when you start listing the litany of insults we have subjected our planet to. Some of my early work was on lake eutrophication, then acid rain, then contaminant transport, then the penetration of ultra-violet radiation, and now of course global climatic change. The situation is especially complicated as we are now subjecting our ecosystems to multiple-stressors.

The lack of long-term monitoring data has brought many Quaternary disciplines, such as my field of paleolimnology, to the forefront of these environmental problems. There is a steadily growing appreciation of the tremendous value of the data that can be produced by Quaternary scientists. Consequently, these are exciting times for paleoecological and paleoenvironmental research. But these are also very scary times.

We do have many tremendously serious and important challenges ahead of us.

It is time for clear, objective, and focused thinking about how and where our efforts and creative approaches can best be employed to meet these challenges. Researchers need to be courageous not only in doing research, but in disseminating it and explaining it to other scientists, politicians and policy makers, and the citizens of this planet who, by and large, paid for the research in the first place. There is nothing stopping us in this important undertaking, except ourselves. These are exciting times for Quaternary scientists. Let's not lose or mishandle these opportunities. We owe nothing less to our colleagues, to our students, and to the public at large.

Once again, thank you very much for this wonderful award.

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