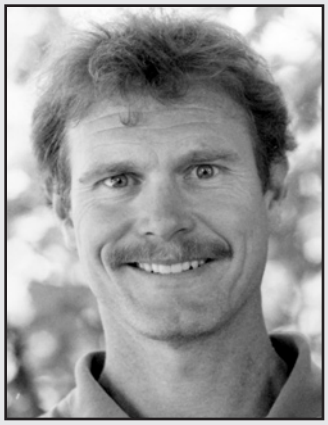
KIRK BRYAN AWARD FOR RESEARCH EXCELLENCE

Presented to Jon J. Major



Jon J. Major
U.S. Geological Survey, Vancouver, Washington

Citation by Barry Voight

It is my very great pleasure today to introduce Jon Major as the recipient of the 2008 Kirk Bryan Award for Research Excellence. The award recognizes his contribution to geomorphology through the publication of the paper, "*Posteruption suspended sediment transport at Mount St Helens: decadal scale relationships with landscape adjustments and river discharges*", which appeared in 2004 in the *Journal of Geophysical Research*.

Jon's paper addressed the widespread landscape disturbance by the great 1980 eruption at Mount St Helens, which damaged or destroyed many tens of thousands of hectares of vegetation, displaced or altered several river corridors, and deposited large volumes of easily erodible sediment on hillslopes and in channels of several watersheds surrounding the volcano. Jon recognized the exceptional opportunity to examine the responses of sediment yields and peak flows to the abrupt and devastating disturbances. He was well aware of the value of a great and sustained compilation of 15 years of unique hydrologic data, then mainly collecting dust in USGS archives. Assuming leadership of the geomorphology project, he chose to combine thorough statistical evaluation of these rich and unique data with his own field observations and insights on processes. The result is a wonderfully well-documented study of landscape disturbance, one that in my experience is unmatched.

Jon distinguished between the impacts on hydrologic responses of 1) a debris avalanche that buried 60 sq km of valley, 2) a lateral volcanic blast that destroyed 550 sq km of forested terrain and deposited (mainly) a sandy tephra with a silt cap, 3) debris flows that reamed channels and deposited decimeters to meters of gravelly sand, and 4) pumice fallout forming decimeter thick gravelly/sand deposits proximal to the volcano. The spatially complex disturbances produced a variety of compensating effects that influenced hydrologic responses. The disturbances abruptly increased basin sediment supplies and transiently decreased infiltration, increased surface runoff, and reduced channel roughness. As a result, Jon could demonstrate that the sediment yields from disturbed watersheds increased initially as much as several hundredfold. He showed that sediment transport has been greater and more persistent from basins having severely disturbed channels, than from basins having mainly disturbed hillslopes. The temporal patterns of posteruption sediment transport mainly reflect depletion and isolation of the primary sources of sediment, but also reflect the variations of water discharge. Jon showed that the persistent extraordinary sediment yields from much-disturbed channels indicate that the supplies of sediment remain accessible, and will not be exhausted for many more years and perhaps decades. This result led Kevin Scott to conclude that, *"Jon's expert and devoted analyses are not only a model of scientific endeavor—his body of work on this subject will save lives and public expenditures in the future…"*

I'll add here just a few other quotations from exceptional scientists to illuminate the quality of Jon's research. From John Costa, National Flood Science Coordinator: *"Jon's 2004 publication…is a wonderful example of rigorous interpretation of the changes, response, and recovery of a catastrophically disturbed landscape… I cannot think of another example of documentation of extensive disruption and careful documentation of processes that follow the landscape response that is as carefully documented and presented as this one."*

Jim O'Connor, a former recipient of the Kirk Bryan Award (1995), says this: *"This paper is a major contribution to the field of geomorphology and Quaternary geology. It addresses the fundamental question of the magnitude and frequency of geomorphic processes and does so with leading-edge quantitative analysis of one of the most complete sets of data ever collected for documenting the effects of major landscape disturbance on water and sediment transport." Jon's research provides "one of the most comprehensive and data-rich analyses of major landscape disturbance ever attempted…"*

Jon Major has enjoyed a distinguished career with the USGS, in geomorphology research, and in the mitigation of volcanic flowage hazards. He has published numerous high-impact journal articles and important USGS publications, and has participated in many responses to volcanic crises. I am proud of what he has accomplished in science and public service. I am equally proud of his strength of character. At the risk of embarrassing him, I want to mention one instance to illustrate the point. In the early 1980s, the debris avalanche deposit at Mount St Helens was being studied in unprecedented detail by Harry Glicken, under the direction of the late Dick Fisher of UCSB, and myself. At the same time, Jon was also engaged in thesis research, involving lahars on another part of the volcano. Many of you know that Harry had narrowly missed death in the 1980 Mount St. Helens blast, but later lost his life along with volcanologists Maurice and Katia Krafft and forty Japanese, from a pyroclastic density current at Mount Unzen in Kyushu on 3 June 1991.

Glicken's 300 page revolutionary thesis on the debris avalanche remained unpublished. Jon Major then sought to remedy this, and on his own time, and borrowing time from his own research, he revised Harry's thesis, had all the illustrations and plates redrafted, and prepared for its publication as a USGS Professional Paper. When the USGS, because of a budget crunch, had to relinquish plans for the publication, Jon persevered and finally saw to it that Harry's thesis was published in full, by the Geological Society of Japan. For this achievement, which did much to stimulate debris avalanche research worldwide, Jon received no personal credit, and yet he had sacrificed about a year of his personal and intellectual pursuits.

I mention this saga in the citation in the hope it might inspire others to serve science in a similar fashion, should occasion arise, and also because it is a measure of the character of our Awardee. On the other hand, when it came time for Jon to measure the hydrologic response of the gigantic debris avalanche deposit at Mount St Helens, it might also be said that Jon was thoroughly prepared.

Jon's research on landscape disturbance at Mount St Helens has produced a monumental work that advances the science of geomorphology, and is eminently worthy of the Kirk Bryan Award. I am sincerely proud of Jon, in many ways, and I congratulate him on this well-deserved recognition of his groundbreaking achievement.

Response by Jon J. Major

Thank you, Barry, for nominating the paper, for your generous citation, and for your mentorship. I also wish to express my sincerest gratitude to Richard Iverson, Kevin Scott, John Costa, Jim O'Connor, and Tom Dunne for their fervent support of the nomination, and to the Quaternary Geology and Geomorphology (QG&G) Division panel members for selecting this paper to receive the Kirk Bryan award.

As the QG&G Division secretary, I was in the odd position of not only knowing that this paper had been nominated, but also of serving as the conduit through which all the other nominations flowed. You will be pleased, but not surprised, to know that we have very talented members in our discipline, as several worthy papers were nominated for this award. I was thus extremely surprised, but most delighted, to learn that my paper had been selected for the award. I am honored, but very humbled, to join those who have previously received this award. I am also acutely aware that this is the 2nd consecutive Kirk Bryan award given to a member of the current QG&G management board. I can assure you that this is merely a happy coincidence mdash; board members receive no advantage in the evaluation process, and awardees certainly need not be board members.

Receiving this award is particularly gratifying for several reasons. This is the 50th time the award has been given. By my count, 18 of those awards have gone to USGS scientists, in whole or in part. But most noteworthy is the fact that this is the 4th time in a generation that the award has gone to someone at the USGS Cascades Volcano Observatory (CVO)—where awardees Richard Iverson, Kevin Scott, and Richard Waitt reside—or perhaps the 5th time if, by extension, I include Jim O'Connor of the USGS Oregon Water Science Center, who received the award for a paper he completed during his tenure as a postdoc at CVO. It is an honor to work at this institution, and a pleasure to work with these and other colleagues of such high caliber. I thank the late Dick Janda and John Costa for providing my career an unconventional trajectory by taking a chance and hiring me with only a MS degree, and then supporting my pursuit of the PhD afterwards. And I appreciate Barry Voight, Richard Iverson, and Tom Dunne taking me under their wings as a student and providing the occasional kick in the pants.

This award is also gratifying because to me it represents a triumph of what I will call "small" science within the field of geomorphology—the kind of science that flourished in Kirk Bryan's day. This is not to say that collecting and processing sediment data over decadal time scales is easy or inexpensive—indeed it requires significant financial and physical resources, and is the type of work the USGS is uniquely suited to conduct. What I mean is that this was a simple, unglamorous, low-profile, small scale project that relied on a foundation of unparalleled data that was freely available in the public domain, rather than the fruit of a multidisciplinary, multi-institutional "big" science project that is commonly sought and aggressively funded these days. I am grateful to the managers of the USGS Volcano Hazards Program for their appreciation of the significance of long-term sediment data collection and to my past and present supervisors for letting me pursue my curiosity unabated. This award also shows that volcanology is truly interdisciplinary—and not simply the bastion of petrologists, seismologists, and geophysicists—and highlights the theme that posteruption geomorphological processes can have more direct societal impact than an eruption itself, something that is sometimes overshadowed within the volcanological community. It also speaks to the need to maintain long-term gauging stations throughout the nation, and the need to figure out how to establish viable, long-term sediment measuring programs—a need that may increase in importance as, for example, more and more moderate to large dams impounding large amounts of sediment are removed across the nation.

Although mine is the only name on the paper, this award in spirit recognizes the supreme efforts of many others who collected, and in some instances initially analyzed, the high-quality data upon which the paper is based—Kurt Spicer, Tom Hale, Dennis Saunders, Randall Dinehart, Dallas Childers, Rick Kittleson, Karl Lee, Mark Uhrich, Dave Meyer, and Holly Martinson to name a few. It is said that ideas come and go, but good data are immortal. To those hardworking colleagues, I offer my sincerest gratitude for creating immortality. I especially recognize the initial data analyses by Randall Dinehart, which served as a launching point for my own analysis.

Regarding Barry's comment about my involvement seeing Harry Glicken's study of the Mount St. Helens debris avalanche come to fruition, I'll say that it was simply a way for me to honor the memory of a friend. I regret that I failed to fulfill Harry's dream of getting it published as a USGS Professional Paper, but I delight that what was published has had such international impact on the fields of volcanology and mass movements. Under different circumstances perhaps Harry might have received the Kirk Bryan award for that work.

To my wife, Michelle, I offer my deepest appreciation for letting me pursue an unconventional lifestyle while she leads the charge handling our spirited twins.

In closing, I want to thank Pete Antilla, now retired from the USGS, for asking me a simple question: after noting that suspended sediment flux is a double mass problem he wanted to know whether sediment concentration or water discharge was the major control on long term trends in sediment flux at Mount St. Helens. Such a simple question launched the analysis that culminated in the paper that is honored today. I also thank John Pitlick, Peter Wilcock, and Rob Ferguson for helping shape the final form of the paper. Finally, to the anonymous reviewer who wrote a particularly scathing review of the original manuscript, I hope you found something positive to take away from the published paper. Thank you, GSA and QG&G for this wonderful honor.