International Association *of* Wildland Fire

Ember Award for Excellence in Wildland Fire Science

The purpose of the "Ember Award" is to recognize sustained excellence in wildland fire research and to encourage innovation, exploration, application, and dissemination of important research results. The name "Ember" reflects the fact that research and science often move slowly, and their benefits or impacts may not be apparent for years. The award was established to recognize sustained and excellent research contributions to wildland fire science, innovative solutions to important wildland fire challenges, and effective and appropriate communication of wildland fire science and research results.

2006

During the 1st Fire Behavior and Fuels conference in Portland in March, 2006, the IAWF presented the first Ember Award for excellence in wildland fire science posthumously to **Dr. Frank Albini** who was a fire behavior scientist at the Missoula Fire Sciences Lab.

IAWF President Chuck Bushey, Dr. James K. Brown, and Elizabeth Reinhardt

2007

The International Association of Wildland Fire presented its 2nd annual Ember Award to **Dr. James K. Brown.**

Jim received his bachelor's degree from the University of Minnesota in 1960, his master's from Yale University in 1961, and his Ph.D. from the University of Michigan in 1968, all in Forestry. From 1961 to 1965 he did research on field measurements of fuel properties and fire-danger rating systems while with the U.S. Forest Service Lake States Forest Experiment Station in St. Paul, Minnesota. In 1965, he transferred to the Intermountain Fire Sciences Laboratory in Missoula, Montana where he conducted research on the physical properties, inventory and prediction of fuels. From 1979 through 1995 he was leader of a prescribed fire and fire effects research unit of 25 employees. His research was focused on fuel consumption, fuel hazard appraisal, fire ecology of western forests, and development of computer information systems for fuel prediction and

application of prescribed fire. He has authored over 100 technical journal articles and reports. In 1992 he received the Forest Service's Superior Science Award for his research on fuels and contributions to fire management.

During Jim's distinguished Forest Service career, his seminal research in fire effects, fuels, and fire behavior set the standard for many in the field. At the start of his career, fire effects science was in its infancy. Jim had the foresight to observe that fire effects are intimately linked to fire behavior so he dedicated much of his career to ensuring that the two fields of behavior and effects were closely integrated in all of his studies. Many of his findings are integrated into the complex fire behavior and effects computer models used today.

A careful scholar, a thoughtful ecologist, and an advocate for wise use of scientific information, Jim exemplifies the qualities honored by this award.

2010

At **the** 3rd Fire Behavior and Fuels Conference in Spokane, Washington, the International Association of Wildland Fire (IAWF) presented its *Ember Award for Excellence in Wildland Fire Science* to **Noel Phillip (Phil) Cheney (CSIRO Senior Principal Research Scientist, retired; Waramanga, ACT, Australia).**

Noel Phillip (Phil) Cheney is one of Australia's leading scientists in bushfire (wildland fire) research. His research has the special hallmark of application as well as good science. Much of his work involved collection of data from experimental and wildfires and the refinement of guides for prescribed burning and fire suppression. During a career extending over more than 40 years

Cheney has rendered outstanding and unique services for improving the wildland fire (bushfire) management and community safety. His achievements are wide-ranging and exemplary and include:

• World class contributions to scientific knowledge (over 50 science articles) of wildland fire behavior under the diverse environmental and ecological conditions in Australia;

• Leading the CSIRO bushfire research team for nearly 30 years during a period of development of innovative practical tools and management strategies applied by fire management authorities in all states, and continually fostered adoption;

• Initiating and conducting large scale multi-disciplinary, multi-agency fire management research projects in contrasting ecosystems designed to validate theories, develop and test complex models, and bring scientists and operational managers together in partnerships through adaptive research;

• Through the CSIRO team organizing and delivering high quality training programs for fire agencies, linking knowledge of fire behavior with strategies, protocols, manuals and custom-made videos to improve fire fighter and community safety;

• Contributing to numerous international scientific reviews, public enquiries, and submissions to governments which have cumulatively influenced policies and regulatory frameworks over many years;

• Leading major contributions to numerous government and coronial enquiries over many years, with notable recent contributions to the enquiry following the disastrous January 2003 Canberra fire and the Royal Commission following the Victorian bushfires of February 2009;

• Setting an exemplary standard in science communications and public education over many decades in response to concerns of community and media who, faced with often conflicting information, seek balanced analysis and advice every summer when Australian landscapes repeatedly come under the threat of fire.

Through dedicated contributions to public good research and highly regarded scientific publications in journals, books and reports, keynote papers, major reports to government and coronial inquiries, scholarly speeches to broad ranges of general and specific interest audiences on topics ranging from the science of fire behavior to history of fire in Australia, and innumerable contributions to public dialogue on sensitive and conflicting issues such as fuel management and prescribed burning, Cheney enjoys an eminent and un-paralleled recognition nationally and internationally among his peers, forest management agencies in Australia, and among community at large.

Cheney has also been recognized through the award of the Australian Public Service Medal (2004) and the Norman Jolly Medal by Institute of Foresters of Australia (2003) for his outstanding services in forestry, forest and bushfire science. Cheney and his research team were awarded the CSIRO Medal for outstanding research achievements in 2003.

Cheney has been a leader in post-fire investigations and has developed an applied scientific technique to objectively reconstruct the factors associated with many significant wildfires, and has presented this information in a clear and understandable manner to Royal Commissions, Coronial Inquiries, public inquiries and in support of litigation.

Cheney has also been an important mentor to several generations of fire scientists in Australia, instilling in them high professional standards, emphasizing development of critical skills in analytical observation, thinking and writing, and, above all, ingraining an overriding sense of the need to search for the truth in a research area that is highly politicized.

2012

The International Association of Wildland Fire (IAWF) is pleased to announce the latest recipient of its Ember Award for Excellence in Wildland Fire Science: **Charles E. Van Wagner,** retired Canadian Forest Service senior research scientist from Deep River, Ontario, Canada.

The Ember Award is recognizes sustained excellence in wildland fire research and encourages innovation, exploration, application and dissemination of important research results. The name "Ember" reflects the fact that research and science often move slowly, and their benefits or impacts may not be apparent for years. The award was established to recognize sustained and excellent research contributions to wildland fire science, innovative solutions to important wildland fire challenges, and effective and appropriate communication of wildland fire science and research results.
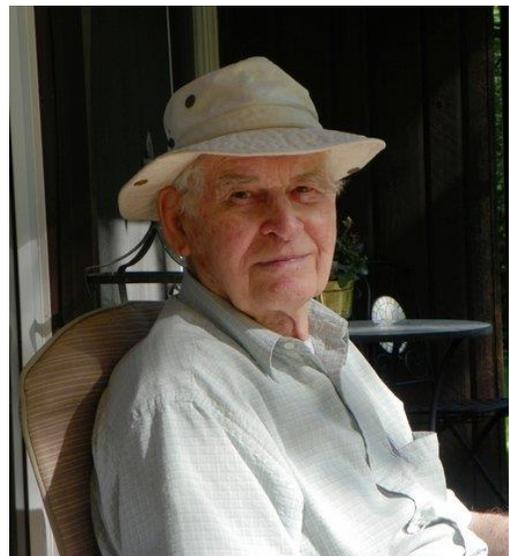
During his 30-year career (1961-91) as a senior forest fire research scientist with the Canadian Forest Service, Van Wagner was the leading fire researcher in Canada and was respected both nationally and internationally as an imaginative and innovative scientist. His contributions to fire science influenced not only his generation of fire scientists but also current fire scientists throughout the world.

While located at the Petawawa Forest Research Centre (later the Petawawa National Forestry Institute), Van Wagner was most recognized (among many accomplishments) for his vital leadership role in visualizing and developing the current Canadian Forest Fire Danger Rating System (CFFDRS), a system that has served as a foundation for the most important fire management information systems and decision-support tools used across Canada since 1970-- and one that has been adopted in, or adapted to, numerous countries internationally over the past several decades .

Key component subsystems of CFFDRS, the Fire Weather Index (FWI) System and the Fire Behavior Prediction (FBP) System, were developed after years of dedicated research by a number of Canadian fire scientists; however, Van Wagner was the acknowledged leader of that group, and the person with the broad vision required throughout this process. His research products received, and continue to receive, broad scientific recognition and operational application, a true indication of their value and relevance.

The Ember Award was presented at the Wildland Fire Canada 2012 Conference in Kananaskis Country, Alberta. Congratulations Charlie.

2013

The International Association of Wildland Fire (IAWF) is pleased to announce the latest recipient of its Ember Award for Excellence in Wildland Fire Science: **Mr. Richard C. Rothermel,** retired U.S. Forest Service, of Missoula, Montana, USA.

Richard Rothermel retired from the U.S. Forest Service in 1994 after a thirty three year career studying the behavior of fire. For twenty seven of those years he was project leader of the Fire Fundamentals Project at the Northern Forest Fire Laboratory in Missoula, Montana studying and modeling the behavior of fire. The lab had just been completed the previous year and his knowledge of aerodynamics was put to the test setting up the wind tunnels and combustion lab for fire experiments. Working with Hal Anderson, they developed fuel arrays and instrumentation tailored for the study of fire in a wide range of fuel and atmospheric conditions. Using an engineering approach, Rothermel sought to extend research results into forms that were useful in the field and for fire management purposes. The subsequent mathematical models enabled him and his team to develop nomograms, calculator chips, and computer programs tailored for operational use.

Dr. Domingos Viegas presented Mr. Rothermel with the Ember Award at the Large Wildland Fires Conference Awards Banquet in Missoula in May 2014. Mr. Rothermel was in attendance along with his wife Marjie. Dr. Viegas and 50+ others nominated Mr. Rothermel

for this prestigious award.

He stated Richard Rothermel is possibly one of the best known names in forest fire science by the majority of persons that have worked in this field during the past decades due to his great and long lasting contribution to forest fire behavior analysis and modeling.

Richard Rothermel started his activity in the field of forest fires in the sixties and coordinated a research team that was already working on the topic for several years at the now World famous Missoula Fire Research Laboratory. Richard Rothermel managed to deal systematically with the large amount of data and insight that was produced by that team to propose in 1972 his Mathematical Model in a report that is possibly one of the most cited documents in forest fire literature. This model was incorporated in a consistent system designated Behave that was released in another historical report in 1983.

These two reports are some of the more influential contributions provided by anyone to forest fire research and practice. They provided to all of us a common language and basic understanding of fundamentals of fire behavior and its relevant factors. In spite of its limitations and of the many announced attempts to produce a replacement to it, Behave model is still the basis of many fire behavior prediction systems that exist and are being used in the entire World. Richard Rothermel also contributed to fire science through several other works and publications and worked in collaboration with scientists form various countries that recognized the value of his contribution and vision for the progress of their investigation. He was requested as an invited lecturer by institutions from several countries.

Although Richard Rothermel did not receive a post graduate degree like a doctoral degree and he may not have published a large amount of scientific papers in peer reviewed journals we must recognize that his work was the basis and the support of many papers and doctoral thesis throughout the World. He certainly deserves recognition for this contribution besides the mere citation of his work.

Richard Rothermel work was instrumental in training operational personnel on the fundamentals of forest fire behavior given the logic and simple way he was able to use to describe the processes and the role of the various parameters involved. Through this better knowledge he certainly contributed to more efficient and safer fire management and suppression.
Richard Rothermel gave a lifelong contribution to forest fire science and management that deserves recognition by the entire community. Although he has already received some prizes and many expressions of recognition in my opinion the Ember Award is the most prestigious and appropriate form to express our recognition and gratitude for his work and career.

2016

Dr. Kevin Tolhurst, AM, Associate Professor, Fire Ecology and Management, Department of Forest and Ecosystem Science, University of Melbourne.
Kevin has developed a professional reputation by providing expert advice on fire behaviour and fire suppression strategies at major bushfires. Some examples include the Black Saturday fires in Victoria in 2009, and the Great Divide Fires in 2007. In 2015, Kevin

was made a Member of the Order of Australia in recognition of his contribution to fire science and the community over a long period. Kevin has developed and taught a number of fire related subjects at undergraduate and post-graduate level as well as a national Fire Behaviour Analyst course for technical specialists in the fire and land management agencies. Kevin's current research activities are centered around developing and applying a bushfire risk management decision support systems. He has established a group of fire scientists in the School of Ecosystem and Forest Sciences with a range of research, fire, land management and teaching skills.

His research and consulting interests include:

• Wildfire behaviour prediction

• Development of prescribed burning techniques and guidelines

• Landscape-scale fire ecology management

• Fire risk management

• Ecological impacts of repeated fires

The difference to most other academic colleagues is that apart from producing a good scientific research, he has used his knowledge to provide support to Fire and Land Management agencies. This has led to the better outcomes to the communities across Australia. Kevin actively participated in training programs in agencies which contributed to better knowledge and safety of fire management personal. Together with Liam Fogarty and Alen Slijepcevic (DELWP, Victoria), he has developed the Fire Behaviour Analyst Course which is now a national standard thought across all jurisdiction. This course had led to the standardisation of knowledge and systems across many jurisdictions and delivered better predictions for going fires and therefore much improved basis for community warnings. From 2007 to 2010 he has provided mentoring to the newly trained Fire Behaviour Analyst which increased the capability and capacity within the Agencies. Through the Bushfire CRC and parallel work with DELWP, Kevin has produced "Phoenix Rapid Fire' prediction systems which enables Fire Services to produce fire predictions quickly and therefore informs the community messaging. This tool also enables Land Management Agencies and Fire Services to evaluate mitigation options and direct efforts to maximise community protection. He also provides the training for agency members on how to use the tool he developed. Currently Phoenix Rapid fire is in operational use in Queensland, New South Wales, Victoria, South Australia and Tasmania. He has been continuously attending community forums where he spoke about fire behaviour and fire mitigation with the aim to improve community knowledge and better prepare them for bushfires occurring in their environment. Kevin has also led and maintained the longest integrated research program into fire and ecological processes in the Wombat Forest area. This program has been instrumental in land and fire agencies better understanding relationships between fire, bushfire risk reduction, biodiversity, carbon and water management. Dr. Kevin Tolhurst was presented with the Ember

Award by IAWF Vice President Alen Slijepcevic at the 5th International Fire Behavior and Fuels Conference in Melbourne.