



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 Albin** 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.

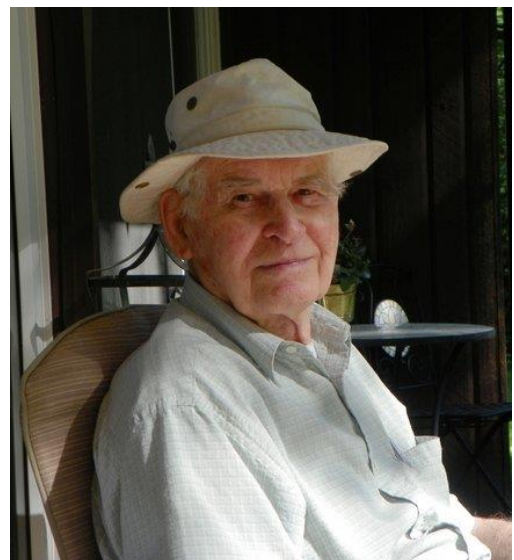
Cheney has been a leader in post-fire investigations and has developed an applied scientific technique to objectively reconstruct the factors associated with many significant wildfires, and has presented this information in a clear and understandable manner to Royal Commissions, Coronial Inquiries, public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

2017

**Brian Stocks, B.J. Stocks Wildfire Investigations Ltd.
Sault Ste. Marie, ON Canada**

Brian has had a long and highly productive career dedicated to the advancement of wildland fire science and management. His research has produced an outstanding record of scientifically original and important papers broadly applicable across the global wildland fire community, while at the same time spending considerable effort to communicate and ensure that new science was delivered in usable forms to fire management agencies.



Brian's commitment and dedication is clearly evident throughout his career. While he did not earn a Ph.D., it did not deter him from completing a successful career in fire research and management. A particularly noteworthy point is that he finished his career in the public service at the top level of the Canadian government's Research Scientist category - a level reached by only a handful of researcher's government-wide and a level almost never attained by one without a Ph.D.

He is the author or co-author of more than 190 scientific papers including 20 book chapters. He has co-edited two books and served as a guest-editor of special issues of scientific journals. He has earned numerous awards for his achievements.

The award was presented at our awards dinner in Boise, ID in October 2017.

2018

The 2018 recipient of the IAWF Ember Award for Excellence in Wildland Fire Science is Dr. Marty Alexander. His award was presented by Alen Slijepcevic, IAWF President, at the Fire Continuum Conference in Missoula.

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Dr. Alexander has had an exceptional 40 year record creating knowledge, packaging and disseminating it to the global wildland fire community. He has continually elevated his professional standing to the point where he is now recognized as the premier expert on many aspects of wildland fire. He has collaborated with colleagues across North America, Europe, the Near East, and 'down under' to develop innovative solutions to crucial wildland fire challenges. With more than 350 publications to his credit, including 61 peer-reviewed articles. According to Google Scholar Citations, his publications have been cited 5,634 times.

His effectiveness as a communicator is further attested to by the roughly 150 invited speeches/lectures given and his interview record with media giants including BBC, CBC, and Discovery Channel Canada. Marty's sustained research excellence and magnitude of their global impacts are affirmed by the dozen+ major awards he has received, including the Canadian Forestry Achievement Award and the coveted James G. Wright Award for career achievement in forest fire research. He was identified in 'Forest Fires: A Reference Handbook' as one of 23

individuals that have influenced wildland fire policy and knowledge globally. Marty is smart, intellectually honest, professionally passionate and holds everyone to the same high standards. Marty has had an outstanding career, with just a few of his accomplishments listed below.

- He is one of four architects of the Canadian Forest Fire Behavior Prediction (FBP) System.
- Co-authored the FBP 'Red Book' field guide which has been copied internationally.
- He co-developed the new generation of practical-oriented models and system software for predicting crown fire initiation and spread as well as other aspects of extreme fire behavior.
- He has authored seminal publications on fireline intensity and crown fire behavior exemplified by three chapters on fire behaviour in the 2014 book '*Fire on Earth: An Introduction*', and the co-authored 2015 book '*A Guide to Rate of Fire Spread Models for Australian Vegetation*'.
- He co-authored a prescribed burning fuels and fire behavior documentation manual that has been emulated by organizations worldwide.
- Popularized the wildfire behavior case-study concept within Canada and elsewhere.
- Conceived the concept of the Canadian Forest Fire Danger Rating System Users' Guide which has been extensively replicated.
- Helped develop fire management applications and interpretive aids nationally and globally.
- Initiated and coordinated a series of fire weather seminars designed to enhance information and technology transfer of fire research results.
- Developed a classification system to describe and communicate fire behavior information used globally by fire managers, fire behavior analysts (FBAN's), and fire scientists.
- Co-founded the two Canadian Interagency Forest Fire Centre fire behavior training courses – *Advanced Wildland Fire Behavior* and *Wildland Fire Behavior Specialist* – and has trained several generations of fire operations staff and FBANs.
- A key member in developing Canadian CD-ROM based training courses for fire behavior, firefighter safety, and fire danger rating.

A Thank You Note from the 2018 Ember Award Recipient

I'm deeply humbled to have received the Ember Award for there are many deserving folks out there. It is indeed a very great honor to receive this award and to be included in the list of previous award recipients, all of whom I view as either wildland fire science icons and/or as personal mentors.

Space does not permit me to acknowledge all the many individuals who have in one way or another contributed to my receiving the Ember Award. However, I would like to acknowledge the following:

- First and foremost is my wife Heather (of 43 years) who kept the home fires burning raising four children while I was away in the field or out of town on other business. Her support over the years has certainly made this all possible.
- Wally Lancaster, Jack Barrows, Jack Dieterich, Jim Davis, Bill Furman, Mike Fosberg, John Deeming and Dave Sandberg for their support and encouragement very early on in my fire research career.
- Brian Stocks and the late Dennis Dube who have been long-serving mentors. Others from the Canadian Forest Service fire research group include Bruce Lawson, Charlie Van Wagner, Rob

McAlpine, Bill de Groot, Kelvin Hirsch, Steve Taylor, Mike Wotton, Tim Lynham, Doug McRae, Brad Hawkes, Mike Weber, Mike Flannigan, Murray Maffey, John Mason, Gary Hartley, Jack Bell and George Dalrymple.

- Phil Cheney and Miguel Cruz with Commonwealth Scientific and Industrial Research Organization of Australia, Chris Trevitt with the Australian National University, Grant Pearce with the Scion Rural Fire Research of New Zealand, and Murray Dudfield with the National Rural Fire Authority of New Zealand.

- To many members of the operational fire management community in Canada for their support over the years, namely Rick Lanoville (Northwest Territories), Terry Van Nest, Dennis Quintilio, Rob Thorburn, Howard Herman and Dave Finn (Alberta), Al Beaver and Kris Johnson (Yukon Territory), Dana Hicks and Judi Beck (British Columbia), and Bill Droog (Ontario) as well as Dave Thomas (U.S. Forest Service) and Frank Cole (Alaska).

- To several members of academia, including Peter Murphy (U of Alberta), Brigitte Leblon (U of New Brunswick) and Mike Jenkins (Utah State U) as well as many graduate students but especially Nathalie Lavoie, Steve Otway and Wesley Page.

- Special thanks to Dale Wade for nominating me and to the award selection committee for considering me as deserving of the award.

There are many others who have contributed, challenged and enriched my work in wildland fire science. To you all I am most grateful.

Sincerely, Marty Alexander

2019

Dr. Wendy Anderson

Throughout her career, Anderson has made highly significant contributions to wildland fire science, notably in the areas of fuel assessment and fire behavior. Her work with the analysis of experimental laboratory and field fires has aided in the development of models to support fire management decision making.



She has published a substantial number of research articles, book chapters and technical reports that have significantly contributed to the advances of wildland fire science across a broad range of fuel types (forest, grass, shrubland) and topic areas including fire propagation, fuel consumption, fuel moisture dynamics and fire danger.

Since completing her PhD at the University of New South Wales in 1987 Anderson has played a pivotal role in the development of an effective international fire behavior research community. Her mentoring role in supporting aspiring scientists through the complex physical attributes of wildland fire research while maintaining a patient considerate approach is second to none. Both in Europe, Australia and New Zealand a generation of current leaders in fire science can be identified as being her direct students and/or having closely worked with her in their early careers. Her Short-courses on fire behavior delivered in the early 90's to late 2000's in Coimbra, Portugal provided early career fire behavior

researchers with a clear view of a cluttered, and sometimes chaotic field with multiple and sometimes competing research approaches.

In addition to Anderson's unparalleled academic work, she also devoted substantial energy to support and advise fire and land management agencies in Australia and New Zealand. Anderson established a bridge between complex scientific results and the needs of end users, providing advice on the most appropriate science to support fire management organization's processes and decision making.

Anderson has retired from the School of Physical Environment and Mathematical Sciences, Australian Defence Force Academy, University of New South Wales, Canberra but she has continued to actively contribute to advancing wildland fire science through publication of scientific papers, mentoring early career scientists, and advising and training fire and land managers.

It can be easily stated that without Anderson's contribution to fire science the current capability to predict fire propagation in Australia and elsewhere in the world would be greatly diminished, with inherent negative repercussions to the safety of fire fighters and the public alike.

Anderson's award was presented at the Sydney, Australia conference.

Dr. Mark Finney

Research Scientist, U.S. Forest Service. Missoula Fire Sciences Laboratory. Missoula, MT.

Dr. Mark Finney has made highly significant contributions to wildland fire science through research in fire behavior. This research has involved fire behavior fundamentals and how key they are to understand the opportunities for improving fire behavior modeling, especially for crown fires. He has led efforts to develop quantitative risk assessment that is essential to evaluating cost-effective operations in fire management.

He is best known as **the father of FARSITE, the world's most successful wildfire behavior model**, which is now an essential component of Forestry Agencies, Firefighting Command Centers and Fire Ecology Departments across the world.

FARSITE has been used since 1995 to model spatial fire behavior throughout the world. **The model allows both suppression and prescribed fire managers to estimate more accurately where fires might burn**, their potential intensity, spotting potential, use of different fire management tactics, and how to better deploy human resources. Before its development all fire simulations were one-dimensional, had no spatial component, and could not take landscape considerations into account. Also, before *FARSITE*, fire behavior analysis work was done by a long and tedious manual process, often too slow to inform Command Centers. Finney's work has paved the way for the development of similar computer models, and multiple fire behavior models in the US, Canada and Australia.



Not only are Finney's fire modelling contributions a standalone tool for foresters, ecologists and firefighters across the world, but *FARSITE* is now available as part of the U.S. Wildland Fire Decision Support System (*WFDSS*) that is **used in planning on every large and long duration federal wildland fire**.

But his contributions do not stop there, Finney has supported wildland fire science in other areas, including, but not limited to:

- Co-creating *FlamMap*, the software for fire mapping and analysis system used to study potential fire behavior across the landscape);
- Serving as team leader for the development of national Wildland Fire Investment Planning System (*WFIPS*) software designed for spatial modeling of initial attack, fuel treatment effects, and large fire costs to inform five federal land management agencies;
- Developing the Fire Spread Probability Model (*FSPPro*) to **aid managers in determining the probability of where and how a fire may spread to**; and
- Led development of tools available in the Wildland Fire Decision Support System (*WFDSS*) in the U.S., which has received numerous awards and recognition, including the *Forest Service Chief's Science and Technology Award* twice and the *Federal Laboratory Consortium Award for Technology Transfer*.

His current research focuses on the study of fire spread in deep and discontinuous fuel beds, which will improve understanding of the fire behaviors that are not understood and able to be predicted today, such as crown fire. He is also investigating fire simulation for the purposes of risk assessment, to support the development of two major fire management systems, *WFDSS* and the Fire Planning Analysis (*FPA*). The Fire Spread Probability model (*FSPPro*) is used in *WFDSS* to estimate the probability of impact of an ongoing large fire. A similar model, *FSIM*, is used to estimate burn probability and variability in fire behavior across large landscapes.

There is no doubt that through his scientific contributions, Finney has greatly improved our understanding of fire behavior and advanced wildland fire science worldwide.

Roger Ottmar

Roger Ottmar has delivered actionable wildland fire science for over 35 years that has enormous benefits for the wildland fire system. He has led national programs that have resulted in 1) 19 volumes of the wildland fuels photo series (digital and hardcopy); 2) operational fuel consumption and emission production models; 3) the Fuel Characteristic Classification System (*FCCS*), and 4) assessing firefighter exposure to smoke. Ottmar is the original designer and project lead for the Fuel Characteristic Classification System and the *CONSUME* application currently in use by land managers across the country for building fuel beds and modeling fuel consumption and emissions from wildland fire.



Ottmar has authored and co-authored over 300 research publications and final reports and has served as principal investigator and Federal Cooperator on more than 100 grants,

agreements, and co-ops between other Forest Service Research Stations, governmental agencies, private corporations, and Universities. He stands-out as one of the most prolific scientists to have worked with the Joint Fire Science Program (JFSP) since its inception in 1998. He regularly presents research at major scientific conferences. Ottmar has led over 35 classes on smoke management and leads several fuels workshops each year, including NWCG training. Ottmar led over 100 scientists and technicians during the Joint Fire Science Program funded Prescribed Fire and Combustion Dynamics Research Experiment (RxCADRE) that was completed in September 2014. Ottmar now leads the much larger national level Fire and Smoke Model Evaluation (FASMEE) Project (www.fasmee.net). Although these accomplishments are vast, Ottmar stands out even farther because of his professionalism and ability to build and lead coalitions within the wildland fire system. In the field of wildland fuels and modeling Ottmar's name rings amongst the loudest.

Some specifics include:

- Leads the Fuel Characteristic Classification System (FCCS) which calculates and classifies fuel bed characteristics (surface through canopy) and their potential fire behavior. Standard FCCS fuel beds exist throughout much of North America and are an important data product of LANDFIRE and are a main foundational data layer in IFT-DSS (<https://iftdss.firenet.gov>).
- Leads the Natural Fuels Photo Series which comprises 15 volumes of registered photographs along with accompanying fuel data which are used to make quick, easy, and inexpensive determinations of fuel quantities and stand conditions for both planning and response operations. (see: https://www.fs.fed.us/pnw/fera/publications/factsheets/factsheet_ps.pdf).
- Has served as an expert on fuel characterization and consumption in numerous workshops involving a large, diverse set of federal and non-federal scientists and practitioners. Important collaborators include EPA, DoD, the Forest Service, NOAA, NASA, and state organizations. Further, he serves as a prominent national consultant and technical expert on assessing top priorities for fire effects modeling and air quality-related research questions. Many of these collaborations do not involve funding, rather it has been Ottmar's professionalism and dedication to the importance of wildland fire science that governed his participation.
- For the last five years, led the development and implementation of the Fire and Smoke Model Evaluation Experiment (FASMEE), a multi-agency, national effort to provide advanced measurements necessary to improve operational fire and smoke modeling applications and their foundational scientific models. By its very nature FASMEE involves a complex network of stakeholders, coalitions, collaborators, and partners.. Most recently, Ottmar has led a coalition of researchers that have successfully competed for over \$5m in new research funding from DoD that compliments the FASMEE program.

Although he is a great and diligent scientist, of equal importance is his ability to interact and work with other people. Many can attest to the unsurpassed role he has played in communicating fuels-related information in various training courses and other settings. He makes incredibly complex biophysical fire science topics easily understandable, which contributes to his research being implemented on the ground for real-world positive outcomes. He is a consummate professional and always ready to commend versus criticize.

Ottmar's award was presented at the Fire Behavior and Fuels Conference in Albuquerque, NM.

Dr. David L. Martell

For 45 years Dr. David Martell has been a passionate and dedicated member of the wildland fire science and management community. Dr. Martell is recognized as a synergistic force for his work in operations research, renewable resource management and forest fire science, and for his contributions to the development of innovative fire occurrence prediction modelling. One of Dr. Martell's seminal research projects involved the development of an initial attack simulation model which strongly influenced the Province of Ontario's decision to expand their air tanker fleet. This decision led to the development of the Level of Protection Analysis System, which allows the structured assessment of the outcomes and costs associated with alternative fire management policies, budgets, and suppression resource mixes, and has been adapted for use by several Canadian fire



management agencies. Dr. Martell has had a strong influence on the development of fire leaders and managers across Canada because he dedicated time to understanding their operational point of view, integrating academic and operational perspectives, and absorbing the real application of fire management. In addition to his research and modelling accomplishments, Dr. Martell is an outstanding collaborator, professor, and student mentor. Dr. Martell established the Fire Management Systems Laboratory in the Faculty of Forestry (now the Institute of Forestry and Conservation in the John H. Daniels Faculty of Architecture, Landscape and Design) at the University of Toronto where he developed approaches to solving regional, national, and international management problems. Under Dr. Martell's guidance dozens of students have received graduate degrees through this laboratory and many now have leadership roles in fire management agencies. Dr. Martell has authored or co-authored more than 75 peer-reviewed papers and dedicates time as an Editor and Member to a number of prestigious national and international organizations.

Dr. Penny Morgan

It is with great pleasure to announce that the recipient of the 2021 IAWF Ember Award is Dr. Penny Morgan, Professor Emerita of Fire Ecology and Forest Ecology and Certified Senior Fire Ecologist at the University of Idaho in Moscow, Idaho, USA. The International Association of Wildland Fire (IAWF) Ember Award is given to recognize and acknowledge sustained achievement in wildland fire science. The name “Ember” was chosen to reflect the fact that research and science often move slowly and their benefits to and influence on society may not be appreciable for a number of years. Since its inception the award has been bestowed on 12 individuals from several countries around the world. Penny Morgan, this year’s recipient has achieved excellence in wildland fire research, teaching, education, outreach, and



technology transfer and has consistently demonstrated creative thinking innovation, exploration, and information dissemination throughout her more than 35-year career. Her accomplishments and contributions fully embody what the Ember Award stands for and reflect many immediate benefits to wildland fire science knowledge including countless impacts that will have lasting influences for decades to come. Her impressive career brimming with accomplishments is worthy of a lengthy description more of which than I can do service to today. Penny’s specialization in fire ecology and management, landscape ecology, and natural resources ecology and conservation biology have yielded groundbreaking accomplishments, established new programs, increased our collective knowledge, and set the groundwork for dramatically improved awareness of the importance, role, and application of knowledge of these disciplines. Some of her most notable achievements include:

A striking publication record including more than 85 peer-reviewed journal articles, 1 book *in press*, 12 book chapters, 28 technical reports, and 60 conference proceedings.

Excellence in teaching and lecturing and student advising. She has mentored over 40 PhD and MS students, 10 senior thesis students, over 150 undergraduates, and has been a graduate committee member for 50 graduate students.

She helped develop and lead the first-ever BS and Master’s degree programs in Fire Ecology and Management in the US. Her innovative approach to preparing future fire ecologists and developing and delivering education and training to managers is incomparable.

She has been recognized through numerous awards in education, including: Outstanding Teacher Award, Outstanding Advisor Award, and U of I Alumni Association Education and Service Award.

A selfless commitment to outreach and information dissemination.

And contributed considerable time and effort in support of professional organizations, including this one, among many others.

While her she has had a profound effect on the wildland fire science community, I also want to emphasize that she began her career as one of only a small handful of women pursuing careers in fire science. Not only is she a stand alone leader in her field, but possibly more importantly, she is a well-respected and admired role model for women in fire science. In short she is richly deserving of the recognition of the IAWF Ember Award. Congratulations Penny!