



## **IN MEMORY**

### **Frank Albini 1936 – 2005**

Frank Albini, fire behaviour research scientist from 1973 to 1985, died of cancer at the age of 69 on 3 December 2005. He was born in Madera, California where he graduated from high school. He attended the California Institute of Technology and earned a B.S. in Aeronautical Engineering in 1958, and a year later an M.S. in Mechanical Engineering. He was awarded a Ph.D. Mechanical Engineering and Philosophy from Cal Tech in 1962.

The wildland fire community is fortunate that Frank felt the call to do fire behaviour research. He was drawn to Missoula Fire Sciences Laboratory not only by the interesting subject matter and the opportunity to make a contribution, but also by outdoor opportunities offered by the State of Montana. Many friends, family, and colleagues have fond memories of hunting and fishing adventures shared with Frank.



In an invited paper for American Scientist titled Wildland Fires (1984) Dr. Albini focused on the current state of knowledge about the behaviour of wildland fires. Following is the concluding statement in that paper: "The list of poorly understood phenomena can be expected to lengthen for some time to come because research in this field is still in its infancy. As the base of knowledge grows, new puzzles will emerge, and explanations that were once accepted will be challenged as their implications are explored. But useful results have been produced from the present level of understanding, and continued research should yield substantial rewards in terms of safer, more economical control and use of wildland fire."

He not only made advances in understanding and describing basic fire phenomena, but also formulated models such that they could be applied. Many of his models form the core of widely used decision support systems.

Among Frank's early influential accomplishments at the Fire Lab (USDA Forest Service, Rocky Mountain Research Station) was development of nomograms for calculating fire spread rate and intensity. Nomograms continue to be used as a training aid and as a field tool for estimating fire behaviour. He also developed and documented FIREMOD, an early computer program for fire

behaviour and fire effects prediction. Frank played an important role in the implementation of mathematical models as tools for fire managers.

Frank conducted analytical and experimental research studies on basic processes governing behaviour of free-burning fires in forest and rangeland fuels. His research addressed flame structure, radiation driven mechanisms of fire spread, soil heating, and crown fire spread. He developed models for fire spotting distance, fire containment, and the consumption and intensity of the burning of large woody fuels. He modelled wind flow into a forest, upslope convective winds, midflame wind speed, and the response of free-burning fires to nonsteady wind.

He was an internationally recognized authority on modelling the behaviour of wildland fire, making presentations and doing cooperative research in Australia, Germany, Russia, Canada, Japan, China, and Portugal. He assisted with the planning and execution of the International Crown Fire Experiment with US and Canadian Forest Services, burning full scale crown fires for data to test a radiation-driven crown fire spread model, which was published in 2004.

Frank had a wide range of talents and interests. He had both a deep and a broad knowledge of many subjects. He was an editor and referee for several technical journals and the author of over 100 refereed papers (many classified). Many who knew Frank through his wildland fire research are not aware of his extensive contributions to other fields. He had 20 years experience in defence-related research and development activities on topics including weapons systems analysis, system component performance assessment and prediction, and ballistic missile defence. He worked for Hughes Aircraft, the Institute for Defence Analysis, General Research Corporation, and Science Applications International Corporation.

In his book, Young Men and Fire (1992), Norman Maclean wrote of Frank Albin "In addition to being a brilliant scientist, he turned out to have a quiet, persuasive literary style that helped to make him an effective half-concealed salesman for the extended uses of mathematical models in the woods."

He applied his exceptional knack for explaining complicated concepts in understandable terms to teaching and writing about wildland fire behaviour. As a Research Professor of Mechanical Engineering at Montana State University from 1992-2001, in addition to teaching introductory thermodynamics and advising senior design teams, he taught first year calculus in provost's experiment to discover why students are so weak in math.

Frank has been described as an unassuming, down to earth, uncommonly brilliant, and interesting person. Ever the thinker, teacher, and communicator, the following is from a letter he wrote six weeks before his death: "I have known frustration and fulfilment, success and failure, deprivation and reward, rebuke and acclaim. Though each negative experience was painful to endure, it made the positive the more poignant. How much more gratifying is acknowledgement after having endured scorn for the effort to achieve. How much more enjoyable is good health after enduring the pains of injury and disease. How much more rewarding is the thrill of discovery after enduring the agony of the quest and the repeated disappointments that seem to accompany all exploration."

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