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3/18/2010

Connie Woodhouse
Associate Professor
School of Geography and Development
412 Harvill Building, Box #2
University of Arizona
Tucson, Arizona 85721-0076

Dear Connie and the Search Committee:

Thanks for the opportunity to comment on Franco Biondi's application for the Forests in the Earth System professorship with Laboratory of Tree-Ring Research and the Institute of the Environment, University of Arizona. I knew Franco through his graduate career at the University of Arizona in Tucson, where I have been based as a research scientist with the U.S. Geological Survey and an Adjunct Professor for my whole career. I have kept up with Franco's professional progress since we first met in 1986, and served as an evaluator for his promotion to Associate Professor in 2005.

Without any doubt, Franco Biondi has proven himself a highly creative, skillful and productive scientist. His interest in tree rings started at the University of Florence, where he analyzed wooden artifacts under Prof. Luca Uzielli for his undergraduate thesis. Franco was hooked on tree rings and in 1985 enrolled at the University of Arizona, the birthplace and one of the main hubs for tree-ring research in the world. Almost overnight it seemed, Franco published a paper with my close colleague Tom Swetnam (now Director of the Laboratory of Tree-Ring Research at the University of Arizona) on the use of Box-Jenkins models in developing tree-ring chronologies from forest interiors (Biondi 1987).

Franco was an excellent student at the University, and his M.S. thesis was ahead of its time. For a managed ponderosa-pine oak woodland in central Arizona, he blended tree-ring records with forest inventories to develop a better understanding of interspecies competition and population dynamics (Biondi et al. 1992). For his dissertation, Franco developed a spatial and temporal reconstruction of growth trends in a ponderosa pine forest (Biondi et al. 1994, 1996). His dissertation eventually produced a seminal paper in *Ecological Applications* on how tree-ring chronologies and repeated timber inventories could be used as forest monitoring tools (Biondi 1999). I remember attending his defense in

May 1994, being impressed by Franco's organizational and quantitative skills, and thinking I had just seen a rising star.

Franco was well organized as a graduate student, and this allowed him to tackle multiple projects at the same time. While working on his dissertation in northern Arizona, he also helped monitor ozone pollution (Mignanego et al. 1992; Biondi et al. 1992) and develop a tree-ring network in Italy (Biondi 1992; Biondi 1993). Franco has since published a number of papers with Italian colleagues on the dendroclimatology, dendroecology and dendrochronology of Italy (Piovesan et al. 2005a & b; Di Filippo et al. 2007; Piovesan et al. 2008, 2009).

After finishing his Ph.D. at the University of Arizona in 1994, Franco went on to a very successful post-doctoral fellowship and research associate appointment at the University of San Diego and Scripps Institution of Oceanography, where he worked with Wolf Berger and Dan Cayan (1994-1998). This was and still is a very productive research group that is almost always on the leading edge of climate science. In his tenure at USD/Scripps, Franco published some seminal papers, including a thoughtful evaluation of response functions in dendroclimatology (Biondi 1997); a climate reconstruction from Torrey pine (Biondi et al. 1997) and his oft-cited tree-ring reconstruction of the Pacific Decadal Oscillation (Biondi et al. 2001). During this time, Franco also published a summer temperature reconstructions from tree rings in Idaho, and offered one of the first suggestions that climate-tree growth relationships may be changing with recent climate change (the so-called "divergence" issue)(Biondi et al. 1999). Franco is a lateral thinker and can always see clever applications of his skills and perspective. On Mammoth Mountain in the Sierra Nevada, leaf browning in lodgepole pine had been previously attributed to drought; using tree rings, Franco showed that it was actually due to CO₂ degassing from magmatic activity starting in 1990.

While at Scripps, Franco began to turn his attention to the tropics, something he's maintained in his tenure at the University of Nevada-Reno. One of the first targets was an isolated and endemic pinyon (*Pinus lagunae*) near the southern tip of the Baja peninsula, and Franco used a combination of ¹⁴C analysis and tree-ring measurements to evaluate the feasibility of using these southern conifers for climatic reconstructions (Biondi and Fessenden 1999). This whetted Franco's appetite for tropical dendroclimatology, and he set up a long-field study of *Pinus hartwegii* near upper treeline on Nevado de Colima, a volcano in the central valley of Mexico that last erupted in 1913. He produced a 400-yr reconstruction of summer precipitation (Biondi et al. 2002), and with Mexican colleagues published an analysis of tree-growth responses to the eruption (Biondi et al. 2003). One of the most important challenges for dendroclimatology is the monitoring and calibration of climate signals, particularly those related to temperature and phenology, at upper treeline. Very little is being done in this area, with one notable exception being the work at Nevado de Colima by Franco and his students (Biondi et al. 2005; Hartsough et al. 2008). Franco has literally been pushing the frontiers of tree-ring science in the tropics, specifically at upper treeline in central Mexico.

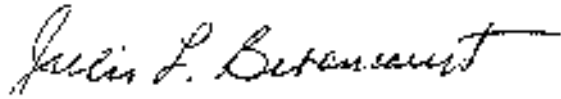
Franco's trademark in dendroclimatology is his considerable statistical, modeling and programming prowess, which he has sharpened in his tenure as a professor at the University of Nevada-Reno. He has produced software that many of us use, including DENDROCLIM (2004). One of my primary interests are patterns, sources and impacts of decadal-to-multidecadal climate variability, and in this area I have adopted both theory and methods from Franco, including his stochastic modeling of regime shifts from long tree-ring reconstructions (Biondi et al. 2002; 2005; Saito et al. 2008; Biondi and Quadan 2008; Biondi et al. 2008).

Overall, Franco has published 43 journal articles, and in all but 13 of them he was the sole or senior author. He has also published 13 book chapters. Franco is an accomplished and popular speaker; and typically receives several invitations a year from universities and meeting/workshop organizers. He has been invited as a Visiting Professor by Stanford University and the Institute of Terrestrial Ecosystems in Zurich. His grantsmanship is also admirable. He is funding current research with \$1.8M that he has obtained through NSF, BLM, and the Southern Nevada Water Authority. Franco also played an important role in attracting the \$15M NSF-EPSCoR grant at the University of Nevada-Reno. Franco has been consistently successful in obtaining grants through the years. A couple of highlights are his NSF CAREER 5-yr grant in 2002-2008 (\$400K) and his NSF grant to develop tree-ring chronologies from upper treeline in Mexico (\$296K, 2000-2003). Franco is resourceful and has a diversified portfolio of small grants from public agencies and contracts from environmental firms.

I have not had the pleasure of experiencing Franco's teaching, but it appears that he has carved out a niche for himself in the Geography Department at the University of Nevada-Reno and he is very active mentor to undergraduate and graduate students. Franco's service to the University of Nevada-Reno and to the scientific community has been commendable

As a scholar and colleague, I am certain that Franco would fit in quite well at the University of Arizona. He is one of the more capable dendroclimatologists in the field, and has a knack for developing creative applications with tree rings.

Sincerely,

A handwritten signature in cursive script that reads "Julio L. Betancourt". The signature is written in black ink and is positioned below the word "Sincerely,".

Julio L. Betancourt, Senior Scientist, USGS
Adjunct Professor, University of Arizona