
Encomium for Jeff Pressing

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ON April 28, 2002, the world lost one of its most vibrant and unique polymaths. At 55 years young, Dr Jeffrey Lynn Pressing passed away in his sleep, the victim of meningococcal disease.

Born in San Diego in 1946, Jeff spent his formative years in the United States of America. By all accounts he was interested in just about everything, but especially in music and science. Jeff's brilliance was obvious even in his youth. In 1962 he was admitted to CalTech at a mere 15 years of age, making him the youngest student to be enrolled in a CalTech degree course to that date. Following his undergraduate degree, Jeff spent a year in Munich on a Fulbright Fellowship, where he learned to speak fluent German. Returning to the States he obtained a Ph.D. in physical chemistry from the University of California in 1972, working under the distinguished Joseph Mayer. Anecdotal evidence suggests that, while deeply involved in his scientific studies, Jeff was constantly listening to all forms of recorded music, particularly classical, much to the annoyance of his college roommates. Despite a successful publication record in physical science, not long after gaining his Ph.D. Jeff decided to turn his attention more fully to music. In 1975 he moved to Australia, where he took up an academic position in the music department of La Trobe University, eventually becoming head of the department.

Primarily a pianist (or as he preferred "keyboarder"), Jeff's talents spanned a range of instruments including bass, guitar, woodwind, and strings. He was probably best known for his mastery of unusual world percussion instruments, particularly West African drums. Much of Jeff's knowledge of African drumming was obtained first-hand doing ethnomusicological research in West Africa, where Jeff was privy to a number of ceremonies and performances previously unseen by Western eyes (ears?). He founded the African drumming group *Adzohu*, teaching a vast body of complex and

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strangely beautiful world rhythms to any who cared to learn. *Adzohu* is still an active university club today, more than 20 years after its inception. Jeff's office was adorned with a variety of well-worn and exquisite musical artifacts. Many visitors recall a particularly special instrument given him by one of his teachers that was "not to be touched by anyone who didn't respect the soul of the drum." As well as playing these more traditional instruments, Jeff was also an avid musical experimenter and toyed with many electronic instruments. In 1988 he held a guest position of associate professor in the synthesis department of the esteemed Berklee College of Music. He devoted much time to exploring computer-assisted and interactive performance, eventually forming an all-electronic ensemble *OZDIMO*. In 1992 he wrote the book *Synthesizer Performance and Real-Time Techniques*. Highly regarded at the time of publication, it is still considered a definitive work on the subject.

Jeff had other interests along the person-machine boundary. He spent some time during the late 1980s and early 1990s collaborating with computer scientists Peter Lawrence and Xudong Cao on an ambitious auto-transcription project known as *transcribe*. Jeff married psychological ideas about pattern recognition, categorical perception, and symbolic representation to more mathematical concepts like complexity and error-functions. With a minimum of human intervention, the resulting program produced transcriptions that strove for cognitive parsimony and cleanliness of musical notation rather than blind adherence to machine-accurate timing or more purely computational methods, which typically produces messy notation bearing little resemblance to the performers' actual cognitive or artistic intentions. Despite the demonstrated power and utility of the method realized in *transcribe*, it has yet to be exploited as a commercial product.

Jeff showed great spontaneity in his performances but also brought a scientist's attention to detail and razor-sharp analysis to his work. In the words of his musical colleague and concert pianist Associate Professor Tony Gould:

Jeff Pressing was an extraordinary musician for several reasons. I had the great pleasure of playing two-piano pieces with him a number of times. The pieces consisted of improvisations, some totally free, others built around pieces from the contemporary jazz repertoire. Knowing the way that Jeff's mind worked (as much as one could get into the mind of a high intellect) and how mine by comparison was somewhat slow, I played with Jeff with no small degree of trepidation. What became clear very soon was that he had an enormous musical vocabulary from which to draw—and marvelous aural comprehension. I remember him stopping and coming around to my keyboard right in the middle of an "all hell breaking loose" section, and asking me if I was going to play "that flattened thirteen chord" next time around. I didn't hear it amongst the "chaos" the first time!

Jeff's more celebrated compositions and performances were those he made with the *World Rhythm Band*. The group created a fusion of African, European, and Middle-Eastern rhythms interwoven with a rich tapestry of traditional melodies, modern tonal jazz elements, and synthesizer creations. Simultaneously challenging to the master musician and accessible to the casual listener, the distinctive sounds of this highly talented ensemble could be heard at some of Melbourne's most famous jazz clubs. The band made several original recordings. The most innovative of these, *Ibex*, was recently reissued on CD.

At the end of 1993, Jeff made a public return to the world of science. Leaving the music department at La Trobe, Jeff moved to the University of Melbourne to become a senior lecturer in psychology. As a great improviser, he sought a greater understanding of the process of improvisation, and turned his attention to psychological problems of creativity, skill, and expertise. Central to his thoughts on improvisation was a concept he called the *referent*. Jeff began from the viewpoint that even the most structured music, such as traditional classical music, must contain some novel elements when performed, if only because of human memory, mood, and performance limitations. Jeff also realized that there was no such thing as 100% improvised, since a person would always bring their skills and past experiences to a performance, which by definition, could not be novel. Jeff laid out a quantitative spectrum of creativity in performance with traditional Japanese music at one end, Persian *Avaz* and free jazz at the other, and *Commedia dell' Arte* somewhere in the middle. He then proceeded to try and unify the processes invoked in all these kinds of performances. In an article encompassing music history, psychology, and subjective performance experience, Jeff used the concept of the referent to articulate a conceptual linkage between the motoric, psychological, experiential, emotional, and dynamic aspects of improvisation. The referent was cognitive representation of information that was dynamically utilized in the control of skilled performance and the creation of novel musical sequences. It could be used to embody well-known psychological constructs such as generalized motor programs, previously memorized melodies, and deliberately chosen cognitive structures such as "themes" for improvisation. Jeff also integrated aspects of the artist's subjective experience, noting that the referent could also encompass representations of mood, emotion and "vibe" of a performance. A referent could also spontaneously emerge as a dynamic theme in a novel performance, feeding back on itself. The exposition of these ideas certainly had a strong motor-programming flavor, with these knowledge structures embedded in control-feedback loops. Other ideas from contemporary cognitive psychology also had a place in this work, but played a mere supporting role in the more general theme of skilled, yet novel human performance.

This concept of the referent was, at least in name, to play a key role in one of Jeff's major contributions to behavioral science in general and music psychology in particular. As in his music, Jeff sought unity—or harmony if you prefer—between diverse scientific concepts. Jeff applied his considerable mathematical talents to understanding the production of musical rhythms. He authored several papers on rhythmic tapping, extending the now-familiar derivatives of the Wing-Kristofferson rhythmic tapping model, and pushed the limits of this framework to encompass the polyrhythms he was so fond of. Referents and error-correction based control were clearly rooted in the so-called motor programming perspective. However, Jeff was fascinated by nonlinear phenomena and saw great merit in the now popular dynamical systems approach. Jeff became somewhat obsessed with finding a rapprochement between these dominant, and apparently antithetical, psychological paradigms. His monolithic effort at fusing these was published in the prestigious *Psychological Review* in 1999. He spent the best part of 5 years working on this manuscript. I can vouch for this personally, having at least six completely different drafts of this paper in my filing cabinet. Beginning under the working title “Death of a Paradigm Crisis,” and later changed to the less inflammatory “Reconciling Dynamics and Cognition,” the work finally appeared in print with the more modest handle “The Referential Dynamics of Cognition and Action” (although Jeff somehow managed to slip in the running head “Reconciling Dynamics and Cognition.”) The paper expounded the fundamental concepts of *referential behaviour theory*, a unifying framework that would allow the more useful ideas of motor programming and dynamical systems to coexist peacefully and potentially incorporate the concepts found in neural nets, chaos, goal-directed behavior, social interactions, and a host of other “standard” psychological results.

Bruno Repp, a leading expert in the area of music perception and skilled motor performance, describes Jeff's *Psychological Review* article as follows:

Jeff Pressing's 1999 article is like one of those musical masterpieces that opens new horizons and reveals new secrets upon each repeated encounter. It is dense with insights at a detailed level and at the same time offers an Olympian view of the scientific landscape. It could have been written only by someone who, like Jeff, possessed an exceptionally broad perspective, acquired through immersion into diverse scientific disciplines and artistic activities, and who at the same time was free of any desire to identify with and promote a particular approach to the exclusion of others.

One of Jeff's goals was the unification and reconciliation of diverse approaches, and this was as much a humane as a scientific agenda. The reader of his article learns that seemingly conflicting formalisms associated with different approaches to the study of human behavior (such as

control theory, information-processing models, dynamic systems theory, and connectionism) are merely subspecies of a grand master equation for controlled processes, and that the choice of approach is (or should be) a matter of empirical adequacy, not of ideology.

Another goal of Jeff's article was the detailed exploration of one particular area, that of human rhythm production. Here he arrived at an astonishing number of interesting conclusions through astute analyses and modeling of a quite limited set of data, produced by two subjects (one being he himself). Although Jeff would surely have agreed that the generality of his conclusions needs to be tested with additional data, he covered so much ground by exercising his theoretical and methodological virtuosity that others are now faced with the less exciting prospect of merely retracing his steps and, most likely, confirming his insights.

If Jeff's masterful article has not made a great splash, it is because it has not stirred controversy. Readers are neither moved to disagree vehemently, nor are they elated by a confirmation of their staunchly held beliefs. Rather, they are likely to come away with feelings of gratitude and enrichment, and with a desire to return to the article for deeper study and intellectual refurbishment. Despite a tragically short career in psychology, Jeff Pressing has made a lasting contribution to the study of cognition and action.

Jeff's work on time-series analysis led logically to an interest in the sharemarket. "If I am meant to be so smart," he remarked, "Why aren't I rich?" In the late 1990s he put himself to work on the problem of analyzing markets. He realized that such analyses required a great deal of computing power but also a measure of intelligence that current computers lacked. To this end he co-founded *Intelligence Corporation*, a company producing artificial intelligences to aid in futures trading. *Intelligence* projects had Jeff's usual eclectic stamp, and drew on ideas from computing, advanced mathematics, psychology, neuroscience and a host of other disciplines to achieve their aims. Of course for Jeff, it was not really about money. Price movements had to be *caused* by something and Jeff used the enterprise, in part, as a vehicle for exploring deep philosophical issues in the sticky topic of causation—a topic, incidentally, he had hoped to write a book on.

The list of achievements described in this short piece only scratch the surface of Jeff's works. Throughout all the larger themes of his life, he continued to stay staggeringly productive in a diverse collection of fields. In addition to his contributions to music psychology, he wrote dozens of short articles on music theory and music technique, for both academic journals and popular publications like *Keyboard* magazine. He was a regular contributor to the cultural columns of Melbourne's largest daily newspaper, for which he was a music reviewer. Even the famous *Grove* encyclopedia has several entries penned by him. His opus consists of more than 50

published musical manuscripts, including works for solo piano, orchestra, choir and vocal groups, chamber ensembles, and completely electronic groups. These works span a broad range of styles from “new classical,” through the heartland of modern jazz, and on to the frontiers *avant-garde*. Jeff’s most recent published recording was *Zalankara*, a modern symphony for traditional Western, multicultural and, electronic orchestras. The work reveals a side of Jeff that would be easy to overlook if one were to concentrate solely on his academic achievements. The apparent collision of cultures in *Zalankara* had a deeper purpose. The work is dedicated to the plight of refugees, and represents a poetic plea for universal understanding and acceptance, a harmony between the peoples of the world.

Jeff the man was as interested in people as he was music, and contributed greatly to the working and personal lives of the people around him. Dr. Sarah Wilson:

I’m sure many could say that after meeting Jeff, the way they thought about life and perhaps even events in their life changed for the better—this was certainly my experience. Jeff became my thesis co-supervisor, greatly enriching my experience as a graduate student and adding new dimensions to my research. He had an enormous capacity to acquire and utilise knowledge on seemingly any topic, and he did this with apparent ease. This meant that he was always involved in numerous fascinating and complex projects, but remarkably he always had time to talk. Perhaps even more amazing was his ability to interact with his students on multiple and changing levels. He didn’t defer to a traditional teacher student model, but rather used any opportunity for the bilateral exchange of ideas. And on completion of my doctorate, he allowed a seamless transition of our working relationship from teacher/student to research collaborators, as we shared and worked out of the same auditory laboratory. Most of all, Jeff was a wonderful friend. There was never a dull moment—he had a great sense of humor, and an exuberance for life that permeated everything he did. I feel honored to have had the opportunity to work with him, and I would like to thank him for all he has added to my life.

Jeff was fundamentally committed to enriching the lives of the students he taught. I myself have a clear memory of checking a result he assured me was correct. When he discovered I had spent a week on it, I cringed expecting a rebuff. “I’m glad you don’t believe me!” he exclaimed, “We’ll make a scientist out of you yet.” Most students who did not know him personally saw him as a brilliant, if slightly terrifying, intellect. Everyone who knew Jeff or had the privilege of speaking with him remembered him as a kind and patient person, humble, with a wry sense of humor.

Despite a hectic professional schedule, Jeff was always calm and apparently carefree. It was common to see him sauntering to and from appoint-

ments whistling a tune, un-self-consciously singing a jazz standard, or perhaps beating out a three-part polyrhythm while talking with a student. Weather permitting, he was a devotee of the Hawaiian shirt, and no reliable witness can recall seeing him in any shoes other than sneakers. His two children were a frequent feature in the psychology department and he always made time to spend with his family, which he considered his number one priority.

How Jeff managed to achieve all that he did in a mere 55 years was a mystery to most. He confided in me once that his secret lay in sleeping only 5 hours a day. Jeff was, however, a man who knew that all humans have limitations, but was a firm believer in testing them thoroughly! He had recently become interested in the game of Royal Tennis—a game which he found both intellectually and physically demanding—and in the space of 3 years had managed to gain a berth in the world championship competition. Luck was not on Jeff's side, and he was knocked out of the competition three games from the title. He took this with good humor. Among his last words to me was a reflection on this experience: "Oh well. You can't be good at everything. Although," he grinned, "Heaven knows I try."

In sum Jeff was talented, energetic, compassionate, brilliant, eclectic and, above all, indefatigable. Jeff is survived by his wife Jill and their two children, Adam and Rebecca. Jeff lives on in the lives of all those who knew him and in a legacy of creative and scientific works that will continue to be a source of knowledge and inspiration for many years to come.

A selected list of Jeff's scientific publications, music and music psychology articles, book and magazine contributions, recordings and musical manuscripts can be found at http://web.access.net.au/~bwilliam/macam/jeff_pressing.html. A limited number of *Ibex* and *Zalankara* CDs are available for purchase. All proceeds go to a memorial fund in Jeff Pressing's honor.