

The Technical Accomplishments of Roger Nichols

- 1944 Born Oakland, California
- 1957 Built a 6" reflecting telescope. First to report discovery of Mrkos Comet.
- 1958 Attended Dr. Edward Teller lecture series at El Camino College
- 1958 Launched several 2-stage rockets fueled by Sulfur/Zinc mixture.
- 1958 Accidentally blew up Junior High classroom during rocket show & tell.
- 1959 Attended Richard Feynman Lecture Series at Cal Tech, Pasadena.
- 1960 Filmed documentary on Mayan ruins in Mexico.
- 1961 B-Fuel Dragster owner/driver
- 1961 Attended GM Fuel injection school.
- 1961 Appointed to Air Force Academy by Lyndon Johnson.
- 1962 Pilot. (for 49 years)
- 1962 Oregon State University Nuclear Engineering Program
- 1963 Experimental audio recordings bouncing between two 2-track tape machines layering guitars with Frank Zappa, Cucamonga, California.
- 1964 Constructed CO₂ LASER for class project with brother.
- 1965 Nuclear Operator at San Onofre Nuclear Generating Station (S.O.N.G.S)
- 1966 Completed BSNE degree in Nuclear Engineering under US Government program with Capitol Radio Engineering Institute, Washington D.C.
- 1968 Start-up crew member Son Onofre goes online. Largest Nuclear Generating Facility. Discovered Samarium build-up problem that was non-existent in smaller reactors.
- 1968 Co-founded Quantum Recording, Torrance California
- 1968 First non-factory repair service for Teac and Revox tape recorders. They did not certify Quantum, they certified Roger Nichols as the factory authorized repair service. First dealer for Infinity planar speaker systems.
- 1968 Recording Engineer, Quantum Studios, Torrance California.
- 1968 Member ARPA (American Racing Press Association). Photographed auto races worldwide for various magazines. Long Beach Grand Prix, Monaco, 24 Hours of Le Mans, Watkins Glenn F1, Indy, Canadian Grand Prix, Japanese

Grand Prix, Laguna Seca, Miami Grand Prix, Belgium Grand Prix. (First Steely Dan album was postponed because of '72 24 Hours of Le Mans race.)

- 1970 Staff Engineer – ABC Dunhill Studios Los Angeles.
- 1970 Consulted with John Ulrick of Infinity on process for creating an all digital power amp. John finished first prototype in 1996. The Spectron PWM
- 1971 First Gold Single: Grass Roots "Two Divided By Love".
- 1972 First Steely Dan album "Can't Buy A Thrill". First Gold Album Award for the Village Recorder, West LA.
- 1974 Steely Dan "Pretzel Logic" recorded at Cherokee Studios, Chatsworth California. Modified head stack and timing on MCI 24-track for tighter punch in/out. First pop recording using only Magna Planer Tympany II speakers for monitoring and mixing.
- 1975 PADI Open Water SCUBA Instructor- (for 36 years)
- 1975 Ham Radio License KE4BDA- (for 36 years)
- 1975 Modified Sansui Quad decoding to provide 20db separation. Adopted by Sansui just before Quad became history.
- 1976 First digital microphone. No moving parts. Directly digitizes sound waves. Could not patent because "no prior art", so it was kept secret. Still in use today.
- 1977 Purchased 1.8MHz 8080 computer. Modified motherboard to accept 56k of memory. Breadboarded TRW microwave A/D & D/A converters for sampling.
- 1977 Assembly Language Programming Class, COMPAL, Studio City
- 1977 GRAMMY Award "Best Engineer Non-Classical Steely Dan "Aja"
- 1978 GRAMMY Award "Best Engineer Non-Classical Steely Dan "FM". Only GRAMMY for one song on soundtrack album.
- 1978 Wendel Rhythm Augmentation System. 100kHz 12 bit sampler and triggered playback system based of 3MHz 8085 processor. Pre MIDI. Triggered by 1/8 note click divided into 4096 sub-clicks.
- 1979 First commercial release of high definition drum samples in pop song, Steely Dan "Hey Nineteen". Also performed drum timing to match that of the player.

- 1979 Patent applications for Digital Audio Sampling Device and Digital Audio Hard Disc Recording Device. Rejected because "Patents not allowed on software processes". (Patent law changed in 1985.)
- 1980 Steely Dan "Gaucho" album released with five songs using Wendel sampler for drums and percussion.
- 1981 GRAMMY Award "Best Engineer Non-Classical Steely Dan "Gaucho"
- 1981 New 16bit Wendel II at 50kHz sampling rate. Digitally interfaced with 3M 32-track machine for direct transfer of samples. Sample accurate triggering. Wendel used to play drums, percussion instruments, sample accurate sequencing of synthesizers, and flying piano, bass, vocals and other elements. Pre MIDI. Samples retrieved in real time from hard disc. (Micropolis 32MB 8" hard disc) Wendel II based on 6MHz 8086 processor.
- 1981 After some recording problems, took one-week technician course studying design of the 3M 32-track. Discovered error in digital transfer circuit, the culprit of the problem. (Found by transferring audio digitally into Wendel II editing computer and viewing waveform.) 3M corrected the circuit and had to retrofit 32 record cards on each shipped 32-track system worldwide.
- 1982 Used Sony F-1 to record additional tracks and synchronized with 3M 32-track during mixdown (Donald Fagen "Ruby Baby").
- 1982 Used F-1 digital masters of "Nightfly" album to produce bin-loop cassette masters (one at a time) directly from digital original saving three analog generations in the cassette production process. Spent 3 days in Philadelphia and 3 days at Capitol Studios in Hollywood producing bin loops. Cassettes were duplicated on Chrome tape and placed in standard shells to more accurately reproduce the digital originals.
- 1982 Wendel used to repair master take of Al Jarreau "We're In This Love Together" when Steve Gadd's snare broke during the recording. Good snare sample recorded and triggered by broken snare hits. (No other takes were as good, so Jay Graydon asked if it could be fixed.)
- 1983 First use of pre-production Mitsubishi X-800 32-track digital machine with X-80 2-track mix machine. Criteria Studios, Miami; John Denver "It's About Time" recorded with The Wailers, Rita Marley & the I-3s, Patti Austin and Connie Reeder.
- 1984 Artists were complaining about the sound of CDs. Roger investigated and discovered that the record companies were using the original master to produce Vinyl records, but used 3rd generation analog copies of the master to

produce CDs. Billy Joel's "Nylon Curtain", Donald Fagen's "Nightfly" and the first Blondie CD were some of the bad CDs released. The problem was corrected and the CDs were then made from digital masters produced from the original masters.

- 1984 First 88.2kHz digital recordings. Employing the $\frac{1}{2}$ sample offset between channels present in the Sony F-1, synchronized 2 F-1s, each recording a mono signal to both channels (left to one F-1, right to the other F-1) yielding stereo 88.2kHz recordings. (The 44.056 crystal was changed to a 44.1 crystal in each machine.) Recordings were of Stevie Wonder playing chromatic harmonica at Amigo Studios.
- 1985 First digital recordings in USSR. Modified Sony F-1s to enable 4- tracks of digital audio on to one single video deck. Used FM tracks of VHS Hi-Fi deck to record audience thus allowing 6-track recording (4 digital, 2 FM) of eleven concerts of John Denver Tour of Moscow, Leningrad and Talin.
- 1985 Used F-1 recordings to triangulate position of Soviet radar device that was scanning the US ambassador's residence in Moscow. Information given to Secret Service, Radar unit found and removed.
- 1985 Developed a digital bin-loop for cassette manufacturing, removing one final analog generation in the cassette duplication process. 128x audio stream was produced by using 64 micropolis hard disks with synchronized spindles, each supplying 1bit of the four 16bit data streams. Warner Brothers was not interested, but the following year they introduced their own DigiLog bin machine.
- 1985 Started Wendel Labs to build a playback only version of Wendel for sale. Wendeljr was a 50kHz 16bit sample playback device triggered by audio for replacing drums and other audio. Latency was less than one sample. Once set, Wendeljr never false triggered. Clair Brothers uses Wendeljr to augment snare and kick on almost every concert tour they do. Still in use in 2010.
- 1986 discovered error in Sony 3348 48-track digital machine. If two machines were synchronized by SMPTE time code, they could be off by as much as 30milliseconds compared to synchronization by Dash-Lock. Sony declared that since only two people complained, they would not fix the problem.
- 1988 John Denver Album "Higher Ground" recorded in Vancouver. John wanted didgeridoo overdubs for album but only 2 studio days left. Printed mix to 1630 $\frac{3}{4}$ " tape. Got CNN to satellite the tape with dropout compensation off to Sydney. Tape delivered to studio. Tape transferred to digital multi-track.

Didgeridoo overdubs were done. Didgeridoo track copied to 1630 and delivered back to CNN, sent to Vancouver, synced in to the multi-track and the mix finished with one extra day to spare.

- 1989 Programmed vocal doubler using Motorola 56000 chip on Digidesign Sound Tools board for Walter Becker "11 Tracks of Whack" album.
- 1989 Gave the source code for "Mouse Scrubbing of Audio" to Digidesign.
- 1990 Developed a vacuum system for reversing the sticky-shed syndrome from analog tapes. Unlike baking, the vacuum method is permanent. First used to archive the entire Roy Orbison collection. Tapes vacuumed in 1990 still play back perfect in 2010.
- 1990 First use of Meyer HD-1 prototype speakers for mixing. (designed to calibrate B&K microphones in an anechoic chamber.) Rikki Lee Jones "Flying Cowboys".
- 1991 First atomic work clock for digital audio (with Wadia). Rubidium Plasma word clock. 3 picosecond jitter. Time base accuracy: one sample drift per 17 years.
- 1991 First use of ½ speed Vinyl transfer to digital for noise reduction purposes. The energy spectrum difference between mechanical clicks and pops, and the music is much more discernable to software (Sonic No-Noise) allowing for less damage to the music during noise removal. Audio then sample rate converted to 44.1 for CD.
- 1991 First use of Meyer SIM II machine to test phase and group delay of audio equipment while playing music instead of bursts, tones or sweeps.
- 1991 Developed software to enhance the audio mix by raising the harmonic content of low level events allowing for more detail to be heard without changing the mix. Used on all mixes and mastering projects from 1991 to present. Developed into a plug-in in 2006.
- 1992 Used Time Code DAT machine to fly audio elements on album projects.
- 1992 used Time Code DAT machine to offset vocal track as "look-ahead" signal for automated vocal rider. Later became Vocal Rider plug-in.
- 1992 Designed curriculum for Musician's Institute recording school (Recording Institute)
- 1992 Started worldwide Master-classes on mixing techniques. Moscow, Havana, Hong Kong, Vancouver, Tokyo, Sydney, Portugal, Paris, Caracas,

London, USA, Beijing, Singapore, Vienna, Zurich, Cologne, Osaka, Niigata, Buenos Aires...

- 1994 Consulted on real-time automation design for Yamaha 02-R digital console.
- 1996 Worked with BOSE to adapt pilot's active noise cancellation headset for use in conjunction with in-ear monitors for drummer Peter Erskine on Steely Dan Tour.
- 1996 Sony 48-track digital machine recording of all shows on Steely Dan tour using mic pres from front-of-house console. This method used instead of mobile truck at each show. Wrote MIDI software to control 4 Yamaha consoles from laptop Mac enabling the monitoring of the 48-track recordings and automate stereo reference mix DATs while mixing monitors for Donald and Walter.
- 1996 First 24bit commercially released recordings. Bela Fleck "Live Art" was recorded and mixed using a prototype of Digidesign Pro Tools

I24 system with 888I24 I/O. For backup, 3 of the pre-released ADAT M-20, 20bit machines were used.

- 1997 GRAMMY Award Producer "Best Children's Album" John Denver "All Aboard"
- 1997 Developed a process to transfer console automation moves from any automation system (NECAM, GML, SSL, Flying Faders) to Pro Tools automation to more accurately reproduce the mixes of archived material.
- 1997 Bounced packet radio containing digital audio off of Moon from Miami to Los Angeles with no errors.
- 1998 Utilized two 24-track Mackie Hard Disc Recorders (synchronized for 48-track) to record Steely Dan tour in the same method as used with the Sony 48-track in 1996.
- 1998 Gave the source code for "Sound Replacement" to Digidesign.
- 2000 GRAMMY Award "Best Engineer Non-Classical Steely Dan "Two Against Nature
- 2000 GRAMMY Award "Album of The Year" Steely Dan "Two Against Nature"
- 2000 GRAMMY Award "Best Album by Duo or Group" Steely Dan "Two Against Nature"

- 2000 "Two Against Nature" was the first commercially released DVD without a Dolby ProLogic audio track, but contained PCM, Dolby Digital

5.1 and DTS 5.1 tracks so the end user could switch between the three audio formats and decide for themselves which one sounded better. After the audio, make the video fit in the space left.

- 2000 Discovered that the CD pressing master can cause jitter in the CD playback by how it is peeled off of the glass master (Steely Dan "Two Against Nature"). Warner Brothers modified their CD production methods.
- 2001 Tec award winner, Best Live Sound, Steely Dan Concert Tour
- 2002 Certified Pro Tools Instructor
- 2003 Gave Dynamic EQ details to TC electronic and Waves
- 2003 Certified Digidesign Pro Tools Instructor
- 2005 Discussed Vocal Rider plug-in with Waves. Waves released their version of Vocal Rider in 2009
- 2005 Started Roger Nichols Digital to develop Plug-ins for Digital Audio Workstations. Produced 12 plug-ins for AU, VST and RTAS systems and 3 TDM versions.
- 2006 GRAMMY Florida Chapter "Lifetime Achievement Award"
- 2006 Developed a process for recovering 1610/1630 and F-1 digital audio tapes directly from video tape without 1610/1630 or F-1 decoder hardware.
- 2007 Tec Award Nomination RNDigital Plug-ins
- 2008 Tec Award Nomination RNDigital Plug-ins
- 2010 Recording, Mixing & Mastering Instructor and Pro Tools Instructor at Video Symphony, Burbank, California.

On April 9th, 2011 [Roger Nichols passed away](#), after a 10-month battle with pancreatic cancer. He continued to teach classes at Video Symphony until just a couple months before he passed.

He continues to receive awards and recognition for his work.

- [2012 Technical GRAMMY Award Winner](#)
- [2013 The Roger Nichols Recording Method book](#)
- [2016 featured in Soundbreaking \(PBS Series\)](#)
- [2017 NAMM TECnology Hall of Fame induction](#)

- July 2017 1.5 million were reached on Roger “The Immortal” Nichols Facebook with one video: “[Roger Nichols and Wendel: The Pioneer of Digital Drum Replacement](#)”