



- NEXT MEETING -

## *“The Origin of Our Digital Media”*

*Tracing Audio, video, DSP and compression,  
back to Fourier’s transform (1807), Dudley’s Vocoder (1938)  
and top secret WWII speech scrambler, SIGSALY (1942)*

Thursday, the 28<sup>th</sup> of June 2018, 17h00  
Bern (venue to be advised)

**SPEAKER:** Jon D. Paul, Crypto-Museum and ARCSI.FR

**LANGUAGE:** English

### Schedule

17:00	Door open
17:15	Presentation
18:15	Apéro
18:45	Suite
19:30	Q&A session
20:00	Optional dinner

### Summary

“The Origins of Our Digital Media: Tracing Audio, video, DSP and compression, back to Fourier’s transform (1807), Dudley’s VOCODER (1938) and the top secret WWII speech scrambler, SIGSALY (1942).”

Mr Jon Paul has created a multimedia presentation summarizing 20 years of research, with unusual photos, unique sounds of the 1939 VODER, vintage music, and the only known sample of top secret 1942 SIGSALY reconstructed speech.

Digital audio technology began with Fourier's harmonic analysis of 1807. The first audio compression was in 1930s, with the VOCODER. Homer Dudley invented electronic speech analysis and synthesis, and achieved ten times speech compression, and the first real time signal processing.

The onset of World War II created an urgent need for speech encryption of strategic conferences via short wave radio networks. SIGSALY was an unbreakable top secret speech scrambler, designed at Bell Telephone Laboratories (BTL) in just six months. Brilliant engineers including Claude Shannon, Henry Nyquist, and Homer Dudley, invented and implemented eleven fundamental breakthroughs, including PCM, flash A/D conversion and spread spectrum.

The presentation will highlight the interesting background of the engineers, inventors and mathematicians who laid the foundations of digital audio. Dudley's and Shannon's work on SIGSALY, and Hedy Lamar's spread spectrum will be discussed in detail. Jon will review the VOCODER and SIGSALY block diagrams, their

construction and operation, thus revealing their close links to audio and video codecs.

The presentation will finish with a novel reconstruction of the very first PCM analog to digital converter, as used in SIGSALY, with vintage 2050 thyatron valves.

### **Guest Speaker bio**

Jon Paul is an inventor, electronic engineer and businessman from Manhattan. He received BSEE and MSEE degrees at CCNY in 1968 and 1971. In 1967, Jon worked at Lawrence Berkeley (nuclear) Laboratories.

In 1968 he was designing real time spectrum analyzers for agencies like NSA and US Navy Underwater Sound Laboratories. In 1971, Jon worked in telecommunications and patent license engineering.

In 1972, he was designing the first digital studio sound effects processors at Eventide.

In 1976, Jon worked at Dolby Laboratories.

In 1983, Jon began consulting in power electronics, digital audio, and high voltage, such as 12kW lights for the 1984 LA Olympics.

In 1986, Jon worked for THX/Lucasfilm on improving theatre sound.

Jon is the holder of seven US Patents.

His 1989 US patent 5,051,799 was the world's first digital microphone, litigated and licensed to 160 mobile companies. Jon has written many Audio Engineering Society papers, and has presented invited papers at the NAB, SBE broadcast and SMPTE cinema engineering conferences.

Since the 1980s, Jon is an internationally recognized researcher, writer and speaker on WWII cipher machines, speech encryption and the links to modern digital technology.

His lectures and papers have been presented at Bletchley Park, Musée de l'Armée (Invalides), Val-de-Grâce (Paris), ENST, Musée des Transmissions (Rennes), AES (Berlin), Google Security (Zurich) and DZNE (Bonn).

Since 2010, his non-profit Paul Foundation has funded research into Parkinson's disease. Jon travels extensively in Europe and has studied French language for 3 years. He is an avid photographer.

REPORT ON PREVIOUS MEETING

- *Special Event* -

***Diploma Ceremony of the 2017 “sound Technicien”  
An Evening with Gisele Clark***

*7<sup>th</sup> of March 2018, Bern*

**SPEAKER:** Gisele Clark

**REPORTER:** Terry Nelson

The AES Swiss Section held a special event at the Zentrum Paul Klee, Bern, on the 7th. Of March that combined the Diploma Ceremony for the graduates of the Federal Diploma for “Sound Technician” and a meeting in the series of “An Evening With...” The speaker for this event was Gisèle Clark, a well-known figure in the world of pro audio and the professional press.

Ms. Clark gave a presentation that covered the history of the Abbey Road studios in London (originally the EMI studios) from the very early days of recording through to the start of the ‘digital revolution’. The story of these world-renowned studios provides an excellent overview of the history of recording in general and how the industry has evolved on the years.

The presentation was interspersed with anecdotes from Gisèle’s career in France; from being the first woman recording engineer (starting at Vogue studios) and going on to professional equipment sales – mainly MCI consoles and tape recorders – before starting a career in the pro audio press. Gisèle Clark was also involved in the organisation of the AES European Convention for many years, dealing principally with the media and helping exhibitors for the show.

The Diploma Ceremony is always an important event for the “Sound Technician” graduates, a diploma that has been organized by the Education Committee of the Swiss AES Section for over 20 years.

The occasion was also marked by prizes for the graduates with top results and these were generously donated by the Swiss distributors decibel, Gotham, Sennheiser and Yamaha. These companies are also sponsors of the practical exams for the diploma as are Merging Technologies and défi technique.

The event finished with the time-honoured apéro, offered by the Swiss AES and Education Committee. This provided an excellent opportunity for the graduates and their families to meet and discuss with the Swiss pro audio community.

The optional dinner afterwards was at the Restaurant Schöngrün next to the ZPK.