

# EE LTH 50 years

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# Overview.

- Before EE LTH.
- EE LTH.
- Dr. EIT LTH.
- Docent EIT LTH.
- Bell Labs.
- SundComm.
- Korea University.
- Summary. Looking back.

# Before EE LTH.

- Born 1943 in Karlskrona.
- Knew early what I wanted to do.
- Electronics engineer choice.
- Not teacher. Dr?
- Hobby electronics.
- Radio control boat 1959. Vacuum Tubes.
- High school graduation in Karlskrona 1962.
- KTH? CTH? LTH?

# EE LTH.

- Chose LTH. Closest to Karlskrona.
- Started Oct. 1962. Graduated June 1966.
- EE LTH started in October 1962.
- Teaching assistant (TA) mathematics 1963-65.
- TA vector analysis and quantum mechanics.
- TA telecommunication theory, ttt, (EIT).
- IAESTE LILCO NY USA summer 1965.

# Dr. EIT LTH.

- Chose EIT (ttt) over Theoretical Physics.
- First military service 1 year (Swedish Navy) and teaching (acting lecturer).
- Started seriously 1969. Slow start.
- Graduated May 1975.
- Became Docent 1975.
- Research Fellow at ESTEC. ESA 1976 Nordwijk The Netherlands.

# Goals.

- One hundred Journal Papers (110).
- One hundred Conference Papers (150).
- One hundred Patents (130).
- Visit 100 countries (152).

# Docent EIT LTH.

- Started 1977, ended 1984.
- Research group in digital mobile radio.
- Study group with Ericsson, Televerket. FOA. CTH. KTH. LTH, LiTH etc.
- Digital mobile radio, 2G was new.
- GSM, 2G came out of this work.
- SUNCOM was born 1978.

# CPM, Continuous Phase Modulation.

- Constant amplitude digital modulation.
- Power and bandwidth efficient transmission.
- Limits on performance.
- Optimum receiver, VA. Simple receivers.
- GSM chose GMSK, a special case of CPM.
- Low complexity linear receiver.



# Bell Labs.

- Started with sabbatical 1981, Crawford Hill NJ.
- Fulltime in 1984.
- Fantastic research environment.
- AT&T Monopoly.
- No funding problems. No students.
- Summer Interns, MIT.
- 1984 breakup of AT&T.
- Narrowband TDMA Digital 2G system.

# Bell Labs (2).

- Lucent Technologies. Murray Hill, NJ.
- DMTS.
- Agere Systems.
- Infineon, LSI, Intel.
- Lucent Digital Radio, iBiquity.
- Took early retirement from Agere 2001.
- Formed SundComm.
- President and Chief Scientist.

# Some Projects for the real world.

- CPM GMSK for GSM.
- 2G TDMA Circular Viterbi Tailbiting.
- 3G WCDMA, UEP.
- HD Radio FM, CPPC codes.
- HD Radio AM, Multi-streaming.
- Sirius XM satellite radio, multi-program joint audio coding.
- MIMO 4G and 5G.

# Publications.

- 3 books.
- 110 journal papers.
- 150 conference papers.
- 130 patents.
- A couple of prize papers.
- Two papers in IEEE COMSOC “Best of the Best”, 2001.

# SundComm.

- Ibiquity Digital Corp. (Lucent Digital Radio).
- HIBOC FM and IBOC FM, HD Radio.
- HIBOC AM and IBOC AM, HD Radio.
- Korea University, Visiting Professor, 2003-2005.
- DoCoMo Labs. Palo Alto, CA.
- MIMO 4G and 5G.
- Retired 2010.

# Korea University.

- Private University, Seoul, Korea.
- Visiting Professor during 3 fall semesters 2003-2005.
- Foreign Scholar program.
- Graduate students.
- Research students.
- MIMO.
- Very energetic and disciplined students.

# Honors.

- Life Fellow of the IEEE.
- Distinguished Member of Technical Staff.
- 2 papers in IEEE COMSOC “Best of the best”.
- Listed in Who’s Who in America and Who’s Who in the World.

# Looking back.

- Was EE LTH the right choice?
- Was ttt, (EIT), the right choice for Dr.?
- Was it worth it to become an EIT Dr.?
- Was it the right choice to move to Bell Labs?
- Academia vs Industry?
- 152 (156) of 195 countries. All 7 continents.



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