

How Materials Science started in Tampere

A Brief History

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Helsinki University of Technology TKK

- Founded in 1849 by Grand Duke Nicolas I
- Received university status in 1908
- Moved from Helsinki to Otaniemi in 1966
- Merged into Aalto University in 2010

Tampere University of Technology TUT

- Municipal scientific library in 1955
- 1960 a small private university moved to Tampere (Yhteiskunnallinen korkeakoulu) – a few years later it changed its name to University of Tampere
- TUT was founded in 1965 as a branch of Helsinki University of Technology
- 132 students started in 1965
- Areas: civil, electrical and mechanical engineering
- Independent University in 1972
- Operating as a Foundation from 2010
- 2019 TUNI = Tampere University = 3 earlier units

Tampere University of Technology TUT

- Locations in Tampere
 - * 1965-1969 Teiskontie 33
 - * 1969-1974 Pyynikintie 2 and Satamakatu 17
 - * 1974- Hervanta campus



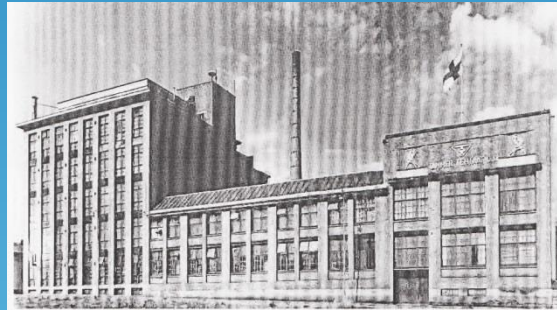
Laboratory of Metal Technology

LMT

- Started 01.01.1969
 - * Veikko Valorinta was appointed acting prof.
 - * used 2 milj. mk for laboratory equipments
- 01.10.1969 Pentti Kettunen was appointed as a professor of Metal Technology by President of Finland.
- 1.11.1969 Pentti Kettunen took the chair (professorship) , Koulukatu 11-13
 - * senior assistant Ilkka Pyyry
 - * lab. technician Pertti Palkonen

LMT

- Locations
 - * 1969-1970 Koulukatu 11-13, two rooms
 - * 1970-1974 Näsilinnankatu 43
 - * 1974 - Kanslerinkatu 5



Pentti Kettunen

- DI 1958 , TkL 1962 , TkT 1965
- Work career
 - * VR Helsinki foundry, manager 1958-1962
 - * TKK Metal Lab. , s.ass., lab.ins. 1962-1965
 - * Outokumpu Oy , research worker 1965-1966
 - * Argonne National Laboratory 1966-1969
research worker / assoc. metallurgy

Excellent experience but very limited possibilities to
start Materials Science in Tampere

IMS 1969-1974

- First Degree Works

*1970 DI degree: Matti Ingberg : Kattilalieriön yhdysreikien vahvistaminen päällehitsauksella

* 1972 TkL degree: Jaakko Autio : Tutkimus karbonyylirautapulverin sintrausmekanismeista alfa-alueella

	DI	TkL	TkT	
1969				
1970	1			
1971	3			
1972	10	2		
1973	6			
1974	9	1		
Total	29	3		

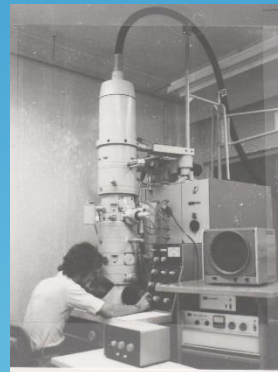
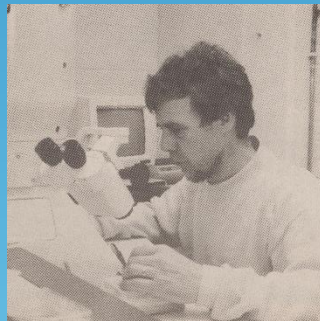
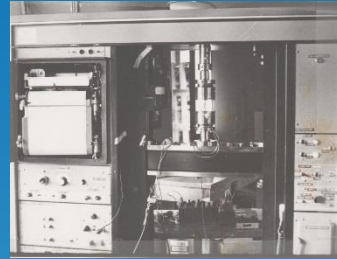
IMS 1969-1974

- Main events

- * 1970 new laboratory in Näsilinnankatu 43
- * 1971 installation of Instron tensile testing machine, Jeol X-ray diffractometer and Jeol JSM-U3 scanning electron microscope with WDS spectrometer
- * 1972 TUT becomes independent University
- * 1972 professorship is named as Professor in Materials Science, and laboratory is named as Institute of Materials Science
- * 1973 first Summer Seminar in Tolva
- * 1973 – 1974 new laboratories in Hervanta Kanslerinkatu 5
- * 1974 associate professor for nonmetallic materials, acting prof. Jussi Asteljoki
- * 1974 Jeol JEM 200 A transmission electron microscope

IMS 1969-1974

- Instron 1115 TT-DM-L
- JDX-7S X-ray diffractometer
- JSM-U3 SEM + WDS
- JEM 200A transmission electron microscope



IMS 1969-1974

- Main research activities
 - * mechanical behaviour and fatigue of metals
 - * service research for industry
 - * failure analysis
 - * Nordforsk co-operation starts
 - + Ni- and Co-based composites materials

Pentti Kettunen : active, talented, impulsive, always new ideas, took always care of his own team

many scientific visions; sometimes really amazing

"Es wird auch da mit Wasser gekocht" (Miekk-oja)

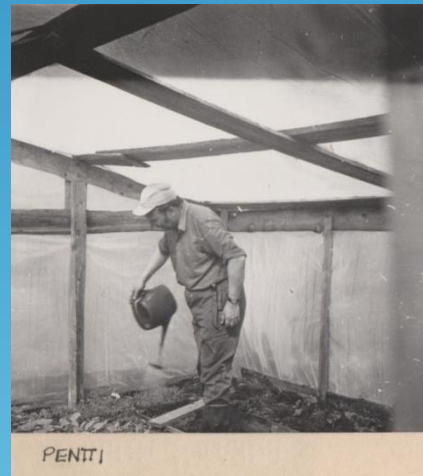
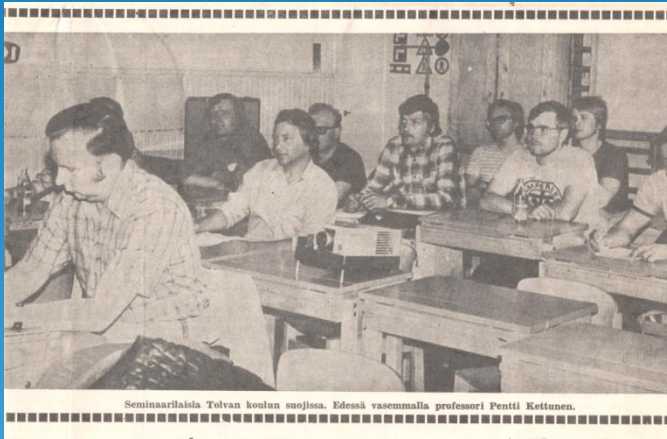
IMS 1969-1974

- **Materials Science in the Wilderness**
- First Summer seminar was arranged in Tolva, Posio
 - * 25.-28.6. 1973
 - * int. Rothman/Argonne, Lehtinen/Metallforsk.
 - * 2 industry, 11 TTKK
 - * seminar – football- seminar - over-night fishing – seminar

Later on; 1974 Kuusamo, 1975 Karstula, 1976 Lieksa, 1977 Kangasala, 1978 Ylöjärvi, 1979 Karkku, until 2010

IMS 1969-1974

- Materials Science in the Wilderness in Tolva 1973



IMS 1975-1979

Degree works

* 1976 TkT degree : Jaakko Autio : Ferriitis-austeniittinen valuteräs ydinvoima tarkoituksiin

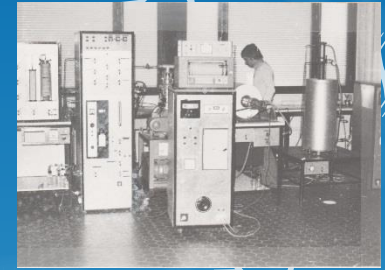
* 1976 TkT degree : Heikki Martikka : Application of statistical model to cyclic work-hardening

	DI	TkL	TkT
1975	4		
1976	5	4	2
1977	6	2	
1978	13	1	
1979	12	1	
total	40	8	2

IMS 1975-1979

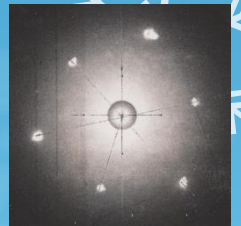
*Main events

- * 1975 FT Pertti Törmälä was appointed as an associate professor of nonmetallic materials
- * 1975 Multi channel analyzer NS-710 to SEM JSM-U3
- * 1975 Bridgman single crystal growth unit
- * 1975 Hopkinson split bar system
- * 1976 Fiskars electro-hydraulic testing machine
- * 1976 CVD coating system
- * 1977 FT Antti Savolainen was appointed as an associate professor in chemistry, acting prof. Aarre Kellomäki
- * 1978 system for amorphous carbon production



IMS 1975-1979

- Main research activities
 - * mechanical behaviour and fatigue of metals
 - * service research for industry
 - * failure analysis
 - * Nordforsk co-operation starts
 - + Ni- and Co-based composites materials
 - * COST 501 co-operation starts
 - * CVD coating
 - * amorphous carbon
 - * Cu single crystal (001), (011) and (-111) growth and testing



IMS Later on

- Laboratory equipments from CCCP (with so called “Egg Money”)
 - * Betatrone PMB-6 ; 1-6 MeV - 250 mm steel
 - * Small Angle X-ray Diffractometer AMUR-1
 - * Spectrometer DFC-36 Analyzer
 - * Tensile Testing Machine P5
 - * Optical Microscopes and Measuring Units
 - * Radiation-meters



IMS Later on

- Important research activities
 - * COST 501 , 501/2 and 501/3 projects
 - # development of gas turbine blades materials to stand temperatures from 900 upto 1100
 - * Rapid Solidification of Metal Alloys
 - * MHD-generator Materials for 2700 temperatures
 - * High Temperature Super Conductors (YBCO)
 - * Amorphous Carbon and Carbon-Carbon composites
 - * Surface Coating with Different Techniques
 - * Biomaterials
 - * Ceramic Materials

IMS Later on

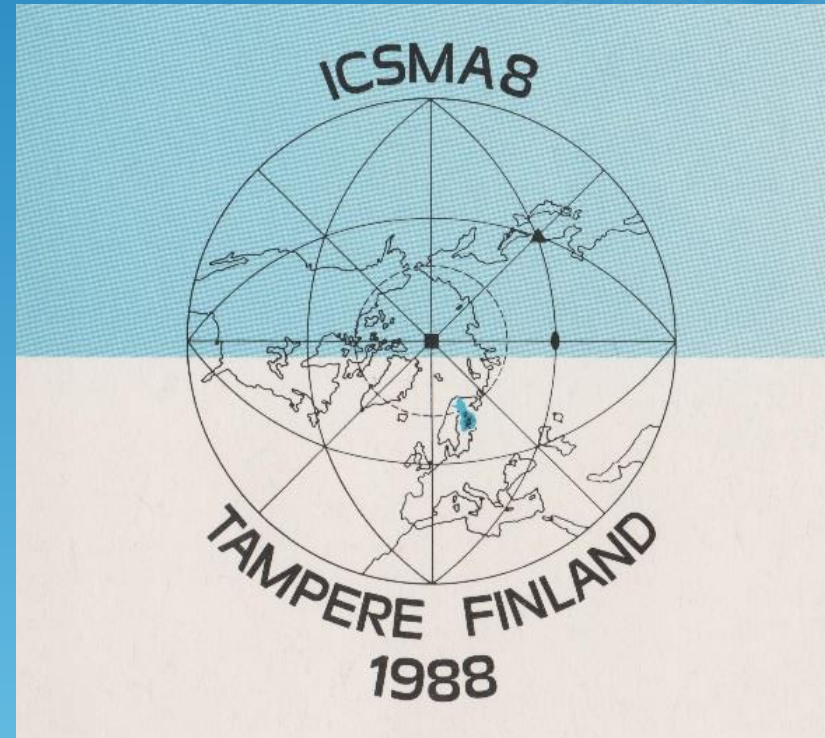
- Main Events
 - * LAL
 - * Foundry Institute
 - * TWC
 - * Activity outside Tampere
 - * Many other events



IMS Later on

- ICSMA 8 International Conference on the Strength of Metals and Alloys 22.-26.8.1988
 - * 330 participants from 21 countries

8th International Conference
ICSMA on the Strength of
Metals and Alloys
TAMPERE, FINLAND AUGUST 22-26, 1988



I want to thank professor Pentti Kettunen for the excellent and talented work in raising up Materials Science in Tampere

I am sure that all those over 1000 DI, over 60 TkL and over 75 TkT , graduated from IMS, will join my congratulations