



# Gerontechnology for serving needs and ambitions of older adults

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# Gerontechnology: background

- Started in 1991: International Congress Eindhoven
- Support from European Union (1992-2000): **networking**
- International Society for Gerontechnology (1997)  
**www.gerontechnology.info**
- International Congresses: Helsinki (1996), Munich (1999),  
Miami (2002), Nagoya (2005), Pisa (2008)
- **Vancouver (May 2010)**, Eindhoven (2012), Taiwan (2014)
- Scientific Journal (as from 2001) **www.gerontechjournal.net**
- Master classes for students (yearly as from 2006): Eindhoven, Taiwan,  
Vancouver
- Discussion website (as from 2006)

# Definition

**Gerontechnology** is:

- the study of technology and aging
- for ensuring an optimal technological environment of all aging and old people
- up to a high age

# Gerontechnology: interdisciplinary

Gerontechnology is based on the combination of:

- Sciences of aging: physiology, psychology, sociology, geriatrics
- Sciences of technology: (bio)physics & (bio)chemistry, building, information, robotics, design, business management

# Cross-fertilization matrix(1)

Technology						
	<b>(Bio)- Chemistry Physics</b>	<b>Architecture Building</b>	<b>Information Communication</b>	<b>Mechatronic s Robotics</b>	<b>Ergonomics Design</b>	<b>Business Manage- ment</b>
<b>Ageing</b>						
<b>Biology Physiology</b>						
<b>Psychology Social Psychology</b>						
<b>Sociology Demography</b>						
<b>Medicine Rehabilitation</b>						

# Cross-fertilization matrix(2)

Technology						
	<b>(Bio)- Chemistry Physics</b>	<b>Architecture Building</b>	<b>Information Communication</b>	<b>Mechatronics Robotics</b>	<b>Ergonomics Design</b>	<b>Business Management</b>
<b>Ageing</b>						
<b>Biology Physiology</b>	Preventive nutrition	Healthy ventilation	Telecare Fun technology	Biorobotics Resource sharing	Inclusive design Standardisation	Care innovation
<b>Psychology Social Psychology (Social Sciences)</b>		Domotics	Situated learning Technology acceptance Networks Fun technology	Temporal discount	Inclusive design Standardisation	Technol. acceptance Persuasive technology
<b>Sociology Demography</b>			Technology generation (protocols)		Technology generation (user interface)	Targeted marketing
<b>Medicine Rehabilitation</b>	Preventive drugs Implant materials		Perceptual implants Telemedicine Telecare Networks	Biorobotics	Self-medication Telecare	

# Pressure for innovative healthcare(1): demography

- Older people 65+ increasing toward 25%
- Old age: several chronic rather than single acute diseases
- Rising costs
- Shortage of professional care

## Pressure for innovative healthcare (2): empower autonomous older people

- Older people wish to control their own lives (autonomy from unwanted carers)
- New technology tools and environments are ready to empower older people towards increased autonomy

# The new healthcare

Endorsing vitality: reading the signs of the times:

- Innovation in technology: Gerontechnology
- Innovation in organisation: Client driven
- Innovation in education: Lifelong for everybody

# Ageing people (1): 3rd and 4th age

## **3rd age (after retirement): active period**

- following ambitions
- doing voluntary work in family and society
- live well despite effects of chronic diseases

## **4th age: dependent period**

- frailness,
- home bound,
- care dependent

# Ageing people (2): diversity

- Gender (more women than men)
- Family composition
- Health
- Genetic disposition;
- Long term physical environment
- Housing, living situation
- Mobility
- Character
- Education
- Work experience
- Income
- Cultural environment

# Ageing people (3): do not use averages

- The average older person does not exist
- Statistically, spread is a more relevant variable (standard deviations, percentiles)
- **Inclusive design** takes this into account

# Ageing people (4): development of generations

- Becoming demographically dominant
- Education level increasing
- Job experience increasing
- Life expectation steadily increasing
- Health improving (medical progress)
- Financial situation generally improving
- Better informed and more assertive
- More active

# Ageing people (5): proactive prevention is the key

- Good nutrition and regular physical activity
- Sustained mental activity of any type
- Continued social activity of any type

These three will keep overall health optimal.

# Health-related goals of ageing people

**Prevention and engagement:** proactive countering of likelihood of future disease e.g. by nutrition, living/working environment, lifestyle

**Compensation and assistance:** counteracting restrictions by tools and environments

**Care support and organization:** effective and efficient care; minimum privacy invasion

# Top-goal of ageing people

- Enhancement and satisfaction of life  
Autonomy and independence for following ambitions and doing whatever one chooses and finds useful and/or pleasant within the limits of one's options

# Changing scene of technology (1)

## **Internet services:**

- **Online information:** nutrition, health and diseases, health services
- **Online communication:** e-mail for advise and help, alarms, telecare
- **Social networks:** prevention groups, risk groups, patient groups, chat groups, 'rumour' groups, 'friends' groups
- **Medical networks:** GP, specialist, pharmacy, care provider, telecare
- **Alert on new options and new services**

# Changing scene of technology (2)

- Ambient intelligence, monitoring, passive alarms
- Home automation: healthy air, safety, security
- Communication tools: Internet, cell phone, telecare.
- Flexible displays
- Identification chips (RFID)
- Navigation tools
- Compensation for bodily and mental restrictions
- Robots ('butlers') e.g. for household work
- **Alert on new products and new services**

# Gerontechnology Impact matrix

## Life Domain

	<b>Health &amp; Self-esteem</b>	<b>Housing &amp; Daily living</b>	<b>Mobility &amp; Transport</b>	<b>Communication &amp; Governance</b>	<b>Work &amp; Leisure</b>
<b>Goal</b>					
<b>Enhancement &amp; Satisfaction</b>	<i>Telemedicine Internet</i>	<i>Wireless/remote (e.g.phone)</i>	<i>GPS navigation Info publ.transp</i>	<i>Mobile phone Internet</i>	<i>Digital. camera Internet</i>
<b>Prevention &amp; Engagement</b>	<i>Healthy diet Home trainer</i>	<i>Smart ventil. Safety illumin.</i>	<i>Car automation Traffic info</i>	<i>Video Links</i>	<i>Focussed lighting</i>
<b>Compensation &amp; Assistance</b>	<i>Passive alarms</i>	<i>Smart IADL</i>	<i>Rollator/walker Battery wheelchair</i>	<i>Hearing Aids</i>	<i>Power tools Robot pet</i>
<b>Care support &amp; Organisation</b>	<i>Smart intake Control-PDA</i>	<i>Electronic keys</i>	<i>Powered lifting</i>	<i>Care Networks Video links</i>	<i>Robots</i>

# Gerontechnology in healthcare: opportunities

- Supportive gerontechnology readily available
- Early preventions postponing later cure
- Active involvement by well-informed older people
- Basis in personalized telecare
- Restrictions compensated by technological environments
- Ambient technology supporting quality of life (despite chronic diseases)
- Telecare immersed in regional culture
- Alertness on new technological products and services

# Changing scene of education

## **Everybody:**

- Lifelong learning (0-100 yrs)
- Empowering all people 50+ : in profession, via Internet; situated learning

## **Health care professionals:**

- Focus medical and care education on autonomous older patients with chronic diseases (geriatrics)
- Continuous re-education of all health care professionals (e.g. on new gerontechnology)



# I am thankful for your attention

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**International Society for Gerontechnology: <[www.gerontechnology.info](http://www.gerontechnology.info)>**

**Quarterly journal Gerontechnology <[www.gerontechjournal.net](http://www.gerontechjournal.net)>**

# Political scene

- Presently fixed on the short term: prejudiced toward frailness in later life, mesmerized by rising costs, little geared toward developing scenes
- long term solution: **empowering older people themselves by continuous education** (ministries of education, health,...); -- usage of Internet services
- supportive environment in public space
- pro-active prevention: physical-mental-social
- taking an active part in caring for themselves
- contributing to society in voluntary or paid work
- **open to new medical and technological options**