




universidade de aveiro




ieeta instituto de engenharia electrónica e telemática de aveiro



Hospitais da Universidade de Coimbra  
E.P.E.



centro hospitalar do Porto




SÃO JOÃO  
HOSPITAL


## Crossing Boundaries: Establishing Interdisciplinary and International Research Collaborations in Life Sciences

Luis M. T. Jesus


School of Health and Institute of Electronics and Telematics  
Engineering of Aveiro, University of Aveiro, Portugal




Universidade do Porto  
**FEUP** Faculdade de Engenharia




INESCPORTO  
LABORATÓRIO ASSOCIADO



UNIVERSITY OF SURREY



UNIVERSITY OF Southampton



CITY UNIVERSITY LONDON

International Distinguished Lecture Series, University of Southampton,  
School of Health Sciences, UK

21st June 2010

## Aveiro

- The city of **Aveiro**, in the central region (“região centro”) of Portugal, is located 80km from the Sá Carneiro (**Porto**) airport, and is easily accessible by train (Linha do Norte) and by car (motorway A1).
- This facilitates any visit from our consultants and presents a great potential for the organisation of small workshops and meetings.



From <http://porto.taf.net>

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## University of Aveiro

- Is one of Portugal's 14 public universities.
- Founded in 1973, has grown into a successful, dynamic and competitive institution.



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## University of Aveiro

- Integrated in the community and region, has a strong research dimension and offers a wide range of educational programmes.
- Research is organised in several areas through a network of 14 Research Units and 4 Associated Laboratories.

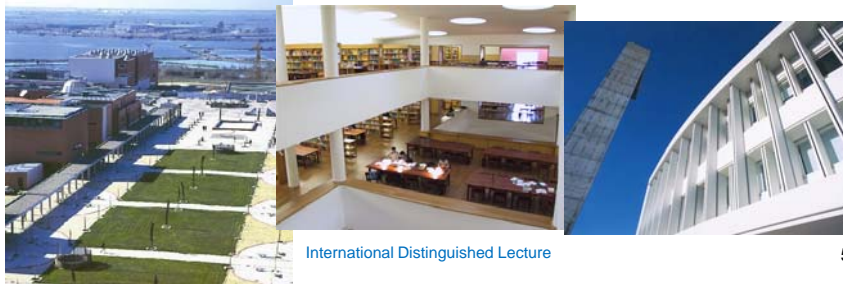


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## University of Aveiro





- Research activities are managed on a multi-disciplinary and inter-departmental basis or around specific programmes and projects.
- Latest research assessment exercise (2008) carried out by Fundação para a Ciência e a Tecnologia (FCT):
  - 77% of the Research Units achieved **Excellent** or **Very Good**.



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## How Did I Get Here?

- Licenciatura, University of Aveiro, 1996. 
- MSc, University of East Anglia, 1997. 
- PhD, University of Southampton, 2001. 
- **School of Health** and Signal Processing Laboratory in the Institute of Electronics and Telematics Engineering of Aveiro, University of Aveiro, 2001-present. 





Electronics



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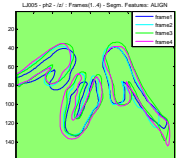
## How Did I Get Here?

- Engineering undergraduate training. 
- Initial Acoustic Phonetics research.  
- Academic post over the last 9 years in a School of Health. 
  - **Teaching** Phonetics, Speech Processing, Speech Production and Perception Modelling, Image Processing and Information Systems.
  - **Supervising** 3 PhD and 8 MSc students doing clinical research.

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## Human Communication Pathology and Rehabilitation Research

- First (to our knowledge) successful bid for a National (FCT) **Research and Development Grant** in Voice Research (**Rehabilitation Research**). 
- Still very much interested in the basic mechanisms of speech and hearing, such as **voicing in speech production and perception**. 

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## Research Morphing

- Developed over the last 4 years **new clinical research** interests:
  - **Broad knowledge base:** computer science, linguistics, physics, signal processing and health sciences.
  - Standardise, validate and objectify **health assessment tools**.
  - Produce a comprehensive set of **publicly available resources** that may assist clinicians in health assessment.
  - Evaluation of **effectiveness** of different **intervention** approaches.
  - Consequences of stroke and aphasia in **activities, participation and quality of life**.



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## Health Research Activity at the University of Aveiro

- **School of Health (ESSUA)** <http://www.ua.pt/essua/>
  - Undergraduate programs in Diagnostic Radiology, Gerontology, Nursing, Physiotherapy and Speech and Language Therapy.
  - Research projects: Rehabilitation and Health Assessment.
- **Department of Health Sciences (SACS)** <http://www.ua.pt/cs/>
  - Undergraduate programs in Biomedical Sciences and Medicine (2011/2012).
  - Masters programs in Gerontology, and Speech and Hearing Sciences.
  - Doctoral programs in Gerontology and Geriatrics (with the University of Porto), and Health Sciences and Technologies.
  - Health Family and Community research group
    - Develop, implement and evaluate family and community intervention programs, which promote the health, quality of living and well-being of individuals, families and communities.

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## Health Research Activity at the University of Aveiro

- **Clinical Psychology**
  - Doctoral program in Psychology.
  - Research projects: Mental Health and Psychophysiology.
- **Associated Laboratories**
  - Centre for Research in Ceramics and Composite Materials (CICECO) <http://www.ciceco.ua.pt/>
  - Institute of Nanostructures, Nanomodelling and Nanofabrication (i3N) <http://www.i3n.org/>
- **Research Units**
  - Centre for Cell Biology (CBC)
  - Institute of Electronics and Telematics Engineering of Aveiro (IEETA) <http://www.ieeta.pt/>




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## Institute of Electronics and Telematics Engineering of Aveiro (IEETA)

- A research unit with a long tradition in Biomedical Engineering and Health Information Systems. 
- Wide range of human and logistic resources available to support the development of high standard research.

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## Main Funding Bodies in Portugal

- Fundação para a Ciência e a Tecnologia (FCT)

<http://alfa.fct.mctes.pt/>

**FCT** Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR Portugal

- Support in a multitude of formats targeted at individual researchers, in the different phases of their careers, or groups of researchers or institutions.

- Fundação Calouste Gulbenkian

<http://www.gulbenkian.pt/>

**FUNDAÇÃO  
CALOUSTE  
GULBENKIAN**

- Private institution of public utility whose statutory aims are in the fields of arts, charity, education and science.

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## Research Funding in Portugal

- Fundação Ilídio Pinho <http://www.fundacaoip.pt>

- Funding of research in science and technology.



- Fundação Bial <http://www.bial.com>

- Supports research in Health through : the biannual Bial Award, one of the most important Health awards in Europe, and its Scientific Research Grants, supporting several hundred researchers in Health in many countries.



- Fundação Champalimaud <http://www.fchampalimaud.org>



- Research and clinical support, particularly in cancer research and neurosciences.



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## Obtaining Ethics Approval

- Approval by the Hospital's (if applicable) Ethics Committee.
- Comissão Nacional de Protecção de Dados (CNPd) <http://www.cnpd.pt>

  - Portuguese Data Protection Authority.
- Comissão de Ética para a Investigação Clínica (CEIC) <http://www.ceic.pt>

  - Pharmaceutical industry and drug trials.

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## Current Research Collaborations (UK)



Madeline Cruice (City University, London)



Victoria Joffe (City University, London)



CITY UNIVERSITY  
LONDON



Anna Barney (ISVR, University of Southampton)



Carl Verschuur (ISVR, University of Southampton)



David Simpson (ISVR, University of Southampton)



David Voegeli (School of Health Sciences, University of Southampton)

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Southampton



Sara Demain (School of Health Sciences, University of Southampton)



Philip Jackson (Centre for Vision, Speech and Signal Processing, University of Surrey)

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## Current Research Collaborations (Portugal)

- Academics

 Alda Marques (ESSUA, Aveiro)  Ana Gomes (DCE, Aveiro)  
 Andreia Hall (Dmat, Aveiro)  Pedro Sá Couto (Dmat, Aveiro)  
 Aníbal Ferreira (FEUP, Porto; INESC, Porto)    
 – Amália Andrade (CLUL, Lisboa)  Centro de Linguística da Universidade de Lisboa  
 – M. Céu Viana (CLUL, Lisboa)








- Clinicians


 Helena Vilarinho (Hospital de S. João, Porto; ESSUA, Aveiro)   
 Celso Martins (Centro Hospitalar do Porto, Porto; ESSUA, Aveiro) 

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## Our Health Research Network

 Hospital de S. João  
 Centro Hospitalar do Porto  
 Unidade Local de Saúde de Matosinhos  
 Hospital Infante D. Pedro, Aveiro  
 New (2012) purpose built Health building with clinics  
 Centro Hospitalar de Coimbra  
 Hospitais da Universidade de Coimbra



From <http://www.cuco.pt>

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## Students and Research Assistants



Maria João Ferreira (SACS , Aveiro), MSc Student

- Ana Rita Pereira dos Santos Correia (SACS , Aveiro), MSc Student



Assunção Matos (ESSUA , Aveiro; SACS , Aveiro), PhD Student



João Lindo Simões (ESSUA , Aveiro; SACS , Aveiro), PhD Student



Marisa Lousada (ESSUA , Aveiro; SACS , Aveiro), PhD Student



Cátia Pinho (IEETA, Aveiro), Research Assistant



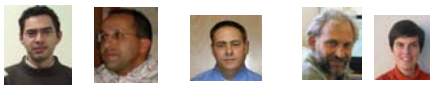
Daniel Pape (IEETA, Aveiro; SACS , Aveiro), Postdoctoral Fellow

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## PhD Projects

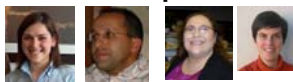
- Assessment and acoustic stimulation of **comatose patients**



- **Aphasia** assessment centred on social and functional aspects



- Intervention for children with specific **language impairment**

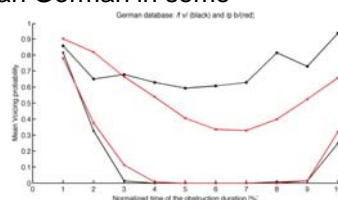


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## Postdoctoral Project

- The Role of the Fundamental Frequency in Vowel and Voicing Distinction for Cross-linguistic Speech Perception and Production (SFRH/BPD/48002/2008) 2009-2013
  - European Portuguese, with respect to (de)voicing patterns, is not in line with other Romance languages like Spanish and Italian. It behaves more similar to the Germanic languages and even shows higher devoicing profiles than German in some conditions.



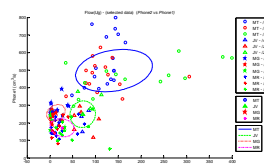
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## Research and Development Project

FCT Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR Portugal

- Acoustic and Aerodynamic Analysis of Speech Production by Patients with Unilateral Vocal Fold Paralysis (PTDC/SAU-BEB/67384/2006 FCOMP-01-9124-FEDER-007470) 2007-2010
  - Study the conditions for initiating and maintaining voicing from aerodynamic, acoustic and electroglottographic (EGG) data, to help us develop new intervention strategies.





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## International Collaborative Project



- Coast2Coast: **Anglo-Portuguese Rehabilitation Research Network 2010-2011**  
  - Establish the Universities of Southampton and Aveiro as hubs for an Anglo-Portuguese rehabilitation research network.
    - Establish Southampton as the University of choice for Portuguese rehabilitation research students seeking to undertake post-graduate research in, or gain supervision from, the UK.
    - Provide opportunities for clinical collaboration, enhancing participant recruitment and data collection.



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## Health Assessment @ UA

- **University of Aveiro's Health Assessment Tools**
  - Intended to be used on a regular basis by Health professionals that develop clinical research at the University of Aveiro and for clinical training of undergraduate students.
  - Our objective is to contribute to the standardisation, objectivity and improvement of assessment procedures in Health.
  - We also hope to promote quality clinical training at the University of Aveiro and it's teaching partners.


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## Health Assessment @ UA

- **Website**

- Tools will be available for download and distribution under the terms of the GNU General Public License as published by the Free Software Foundation 
- <http://www.gnu.org/licenses/>
- There will be a registration process that will help us identify a group of clinicians around the country that will collaborate with the University of Aveiro in further validation of the tools.
- Check for news of the launch of the new website at my personal webpage <http://www.ieeta.pt/~lmtj/>

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## Registered (Trademark and Copyright) Health Assessment Tools

- **Nursing**

- Coma Recovery Instrument



- **Speech and Language Therapy**

- Case History Form for Children
- Assessment Protocol for Children Who Stutter
- Case History Form for Child Language
- Swallowing Case History Form
- Swallowing Evaluation Protocol
- Voice Evaluation Protocol
- Standard Voice Case History Form

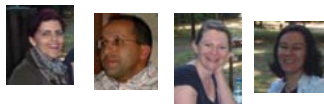


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## Soon Registered (Trademark and Copyright) Health Assessment Tools

- **Cross-disciplinary (e.g., Medicine, Nursing, Physiotherapy, Psychology or SLT)**
  - Portuguese Modified Mini Mental State Examination
  - The Activities/Participation Profile (TAPP)
  - Portuguese translation and adaptation of the Communication Disability Profile (CDP) and the Participation Objective, Participation Subjective (POPS) Tools



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## Opportunities for Collaboration



- The University of Southampton has well established links with Luís Jesus and Alda Marques at the University of Aveiro.
- Both undertook their PhDs in Southampton and, since returning to Portugal.
- Have invited University of Southampton staff to supervise PhD students, collaborate in research grants, establish Erasmus exchanges and conduct educational/research workshops.

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## Advantages to Both Parties



- Generate international collaborative research grants.
- Establish Southampton and Aveiro as the universities of choice for UK and Portuguese rehabilitation research students seeking to undertake post-graduate degrees.
- Provide enhanced opportunities for clinical collaboration, enhancing participant recruitment and data collection.

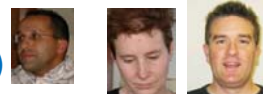
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## Future Research and Development Project

FCT Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR Portugal

- Speech Production and Perception in **Hearing Impaired Children** (PTDC/SAU-ENB/111006/2009) 2010-2013 (?)





– Speech production and perception by profoundly deaf children with a cochlear implant (CI) and phonological developmental patterns characteristic of this population.

- Reference database for future research in this area.
- Comprehensive set of publicly available language resources and recommendations that may assist clinicians in the assessment of CI children speech skills and the devising of enhanced therapeutic strategies.

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## PhD Students (Starting October 2010)



- Development of a European Portuguese Pathological Voice Database and Methods to Differentiate Voice Disorders – [Cátia Pinho](#)

  - Acquire a representative European Portuguese (EP) pathological voice database (not existent for EP).
  - Study/test existing techniques to detect voice disorders.
  - Develop new methods to detect and differentiate voice pathologies.
- The Impact of Communication Disability in People's With Aphasia Quality of Life (QOL) – [Brígida Patrício](#)

  - Develop adequate strategies to use the WHO QOL Bref tool with People with Aphasia (PWA) in order to assess the impact of communication disability in PWA's QOL.

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## Future Postdoctoral Fellowship

- Objective measures of physiological responses to acoustic stimulation in **comatose patients**.
 

  - Effectiveness of coma stimulation programmes, which may improve a patient's outcome and quality of life.
  - Development of biomedical signal analysis methods to assess physiological responses to auditory stimulation of comatose patients.

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## Further Rehabilitation Research at University of Aveiro





- Ongoing research at University of Aveiro related to the objective assessment of various pathologies and outcome measures based on acoustic signals
  - Adventitious Lung Sounds as Indicators of Severity and Recovery of Lung Pathology and Sputum Location (PTDC/SAU-BEB/101943/2008) 2010-2013
 










  - Sounds4Health 2010-2013
 







  - Creation of an Adventitious Lung Sounds Database of Healthy People 2010-2011






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## Further Rehabilitation Research at University of Aveiro

- Rehabilitation for Elderly COPD Patients and Their Families: Promoting Integrated Programs Based on ICF 2010-2012
 






- ICF to Develop Integrated Interventions on Severe Dementia Patients 2010-2012
 

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