



Stable Next-Generation Photovoltaics: Unravelling Degradation Mechanisms of Organic Solar Cells by Complementary Characterization Techniques  
StableNextSol – MP1307

Presentation of 7<sup>th</sup> MC Meeting + 6<sup>th</sup> WG Meeting + Industrial day

Ana Charas

*3<sup>rd</sup> MC Meeting, 2<sup>nd</sup> WG Meeting, 2<sup>nd</sup> Conference E-MRS Symposium E @ E-MRS.  
Lille, Fr. June 11<sup>th</sup>- 12<sup>th</sup>, 2015*



COST is supported by the  
EU RTD Framework  
Programme

ESF provides the COST  
Office through a European  
Commission contract





StableNextSol

COST MP1307



## TENTATIVE TITLE: **Stability/degradation of Materials**

Action Activity: 7<sup>th</sup> MC Meeting + 6<sup>th</sup> WG Meeting + Industrial day

(Tentative) Date: 5<sup>th</sup>-7<sup>th</sup> April, 2017

Country: Lisbon, Portugal (Congress center, Instituto Superior Técnico)

Duration: 3 days

Number of assistants (expected): ca. 100

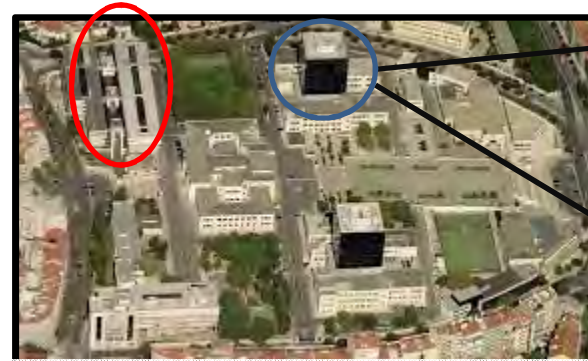
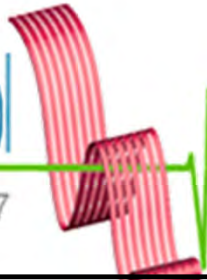
Topics: - “Lessons” (short talks) from Short Term Scientific Missions

- Talks from members from industries in StableNextSol

- .....

StableNextSol

COST MP1307



IT @ IST

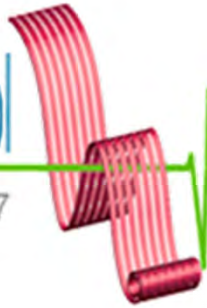
IST – Instituto Superior Técnico

*Lisbon – capital of Portugal*

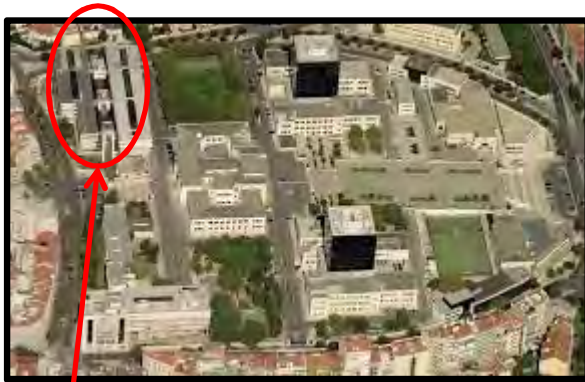


StableNextSol

COST MP1307



## Venue



Congress center @ IST

Av. Rovisco Pais, 1049-001 Lisbon

Subway: Alameda or Saldanha (red line/airport line)

Several hotels in the nearby: Hotel A.S. Lisboa \*\*\* (discounts for IT, IST)

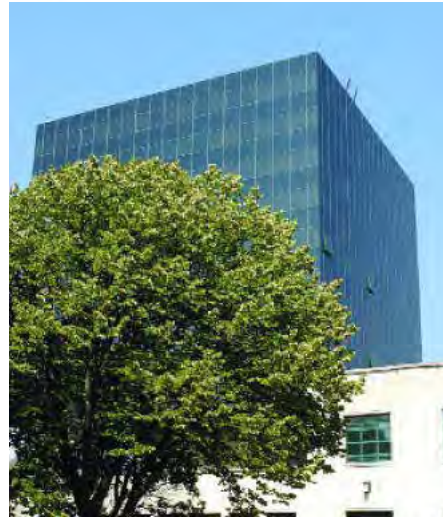
Holiday Inn Lisbon \*\*\* (discounts for IT, IST)

Holiday Inn Lisbon Continental \*\*\*\*



Instituto Superior Técnico, Av. Rovisco Pais





***Ana Charas – Senior Researcher @ Organic Electronics Group (oeG) – IST/IT***

***ana.charas@lx.it.pt***

Instituto de Telecomunicações (IT)

Instituto Superior Técnico (IST), Av. Rovisco Pais, Lisbon, Portugal



[http://www.it.pt/site\\_group\\_detail\\_p.asp?id=10](http://www.it.pt/site_group_detail_p.asp?id=10)

[http://www.it.pt/person\\_detail\\_p.asp?id=386](http://www.it.pt/person_detail_p.asp?id=386)

## ***Who we are***

### **Researchers**

#### **6 PhD Permanent Staff**

- **Luís Alcácer**
- **Jorge Morgado**
- **Ana Charas**  
([ana.charas@lx.it.pt](mailto:ana.charas@lx.it.pt))
- **Henrique Gomes (at Univ. Algarve)**
- **Manuel Matos**
- **Rui Henriques**
- **+ 4 Pos-docs + Graduate Students**

## ***What we do***

### **Current Research Topics**

1. **Materials Preparation: Semiconducting and Electroluminescent Polymers and Small-Molecules.**
2. **Solar Cells. Organic photovoltaics (OPVs), Perovskite-based solar cells.**
3. **OFETs and OLEDs.**
4. **Implantable Organic Nano-electronics.**
5. **Organic printed electronics.**
6. **Non-volatile resistive switching memories.**
7. **Unimolecular devices.**
8. **Quantum chemical calculations**

# Facilities @ IT-Lisbon

Synthesis → Characterization (structural, optical, electrochemical, morphology,...) → Devices Fabrication



Organic Synthesis Laboratory



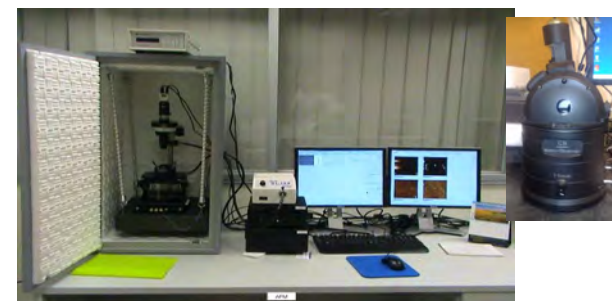
Glove box with device fabrication and measurements facilities



UV-Vis spectrophotometer (900-200 nm)



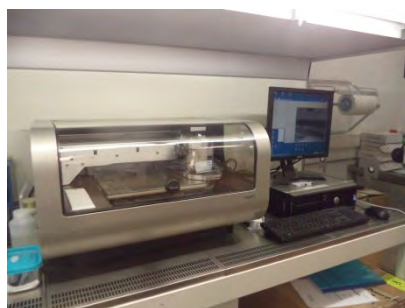
Profilometer



STM/AFM and Nano-observer (AFM)



Vacuum evaporator



Inkjet printer for conducting polymers/inks



Solar Spectrum Illuminator AM1.5 Newport Oriel 3A

- O<sub>2</sub> Plasma Cleaner*
- Spin Coaters*
- Reference Solar Cell and meter 2x2 cm calibrated, Oriel*
- +** *Solar Spectrum Illuminator AM1.5 Newport Oriel 92250A*
- Laminar flow workstations*
- Testing systems for OPVs, OFETs, OLEDs, Memories.*

# Projects in Photovoltaics Research

## (Running) European Projects (3)

1. **FlexNet:** Network of excellence for building up Knowledge for better System Integration for Flexible Organic and Large Area Electronics (FOLAE) and its exploitation
2. **POCAONTAS:** Marie Curie training network that aims to explore the use of carbon nanotubes in photovoltaic cells.
3. **PHOCS:** aims to explore the use of conjugated polymers in photoelectrochemical cells that can produce hydrogen.

## (Running) National Projects (2) (FCT)

1. **Artificial Leaves:** Development of ionic current organic photovoltaic cells based on water-soluble photoactive polymers and sensitizer dyes embedded in a biocompatible matrix. (finish April, 2015)
2. **LIQ-OPVs:** Towards very efficient organic photovoltaic cells through utilizing liquid crystal phases as electron-acceptors. (finish April, 2015) (Coordinator: A. Charas)

## COST Action (European Cooperation in Science & technology)

StableNextSol – Stable Next-Generation Photovoltaics: Unraveling degradation mechanisms of Organic Solar Cells by complementary characterization techniques

## Past Projects (2) (FCT)

1. **ARCOCEL:** Specially Designed Materials and Architectures for Organic Photovoltaic Cells (2008-2011) (Coordinator: A. Charas)
2. **NANOPEPS:** Micro- and Nanopatterning of cross-linkable electro-active polymers by spin-coating (2011-2013) (Coordinator: A. Charas)

## (Running) PhD Thesis (supervised or co-supervised by A. Charas)

1. Synthesis of conjugated polymers to sort carbon nanotubes by chirality, Rajesh Veeravaran, 11-2016
2. High efficiency polymer-based photovoltaics through morphology control, Joana Farinhas, 2-2016
3. New materials for organic solar concentrators and photovoltaic cells, Maria da Graça Brotas, 6-2015
4. Electron-accepting materials for cost-effective and environmentally friendly OPVs, Cristiana Costa, 4 - 2018

## Master's Thesis (supervised or co-supervised by A. Charas)

1. New cross-linkable organic compounds for applications in photovoltaic cells, Cristiana Costa, ISEL & IT, 12-2014
2. New Cross-linkable Donor Polymers for Nanostructured OPV cells, Soraia Lourenço, ISEL & IT, 1-2013
3. Aplicações de compostos orgânicos como camada activa em células fotovoltaicas, Joana Farinhas, ISEL & IT, 1-2010