

# Andrea Migliorini

## Curriculum Vitæ

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## Objective

**Goal** Pursuing a PhD student position in a top research institution or university in nanotechnology.

**Research Interests**

- Spintronics and magnetic materials
- Nanotechnology for Energy Sustainability (e.g. Photovoltaics, Fuel Cells, Energy Storage)
- Thin films (Physics and Technology)

## Education

- 2010 – 2013 **M.S. Degree in Physics Engineering**, *Politecnico di Milan*, Milan, Italy.  
Selected as one of the first participants in the newly formed EAGLES International Exchange Program between Politecnico di Milano (Italy), Drexel University (USA), Universidad Politécnica de Madrid (Spain)  
**Key subjects:** Solid State Physics, Photonics, Low Dimensional Systems, Nanotechnology, Photovoltaics, Electron and Atomic Force Microscopies.  
**Anticipated Graduation Date:** July, 2013
- 2011 – 2012 **M.S. Degree in Mechanical Eng. & Mechanics**, *Drexel University*, Philadelphia, PA, USA.  
Studies and research as part of EAGLES International Exchange Program  
**Key subjects:** Heat Transfer, Plasmas, Statistical Mechanics, Computer Science, Mathematics.  
**GPA:** 3.83/4.00
- 2007 – 2010 **B.S. in Physics Engineering**, *Politecnico di Milan*, Milan, Italy.  
**Key subjects:** Fundamental Physics, Quantum Mechanics, Optics and Laser, Material Science, Mathematics, Electronics.  
**Final score:** 108/110
- 2002 – 2007 **Scientific High School Diploma**, *Liceo Scientifico Statale Galileo Galilei*, Caravaggio Bergamo, Italy.  
**Achievements:** Member of school team for participation in Mathematics Olympics.  
**Final score:** 100/100

## Master's Thesis

**Title** *Spin Valves for CPP Electronic Nanodevices*

**Supervisors** Dr. Franco Ciccacci — *Politecnico di Milano, Milan, Italy*  
Dr. Jose Luis Prieto — *Universidad Politécnica de Madrid, Madrid, Spain*

**Description** Fabrication of Current Perpendicular-to-Plane (CPP) Spin Valve nanodevices has been achieved. Spin Valves have been grown through Magnetron Sputtering Deposition and their magneto-electrical properties have been optimized after electrical characterization. A CPP configuration has been achieved through Inductively Coupled Plasma Reactive-Ion Etching (ICP-RIE) and Magnetron Sputtering Deposition.

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## Experience

2012 – 2013 **Research Assistant**, *Grupo de Dispositivos Magnéticos (GDM)*,  
ISOM, Universidad Politécnico de Madrid, Madrid, Spain.

*Research Project:* Spin Valves for CPP Electronic Nanodevices.

- Design of thin film layer stacks
  - Layer structure & materials to create “Spin-Valve” structures
  - Optimization for Magnetoresistance and Exchange Bias
  - Understanding of quantum theories of ferromagnetism & giant magnetoresistance
- Film Stack Deposition
  - D.C. & R.F. Magnetron Sputtering
  - Clean room procedures (class 100-1000)
  - Substrate preparation & cleaning
  - Nano-Lithographic techniques (Electron Beam Lithography)
- CPP Device Fabrication
  - Thin film stack deposition, via a combination of R.F. & D.C. sputtering
  - Design and nano-lithography of contact patterns and wire geometry
  - Inductively Coupled Plasma Reactive-Ion Etching (ICP-RIE)
- Characterization
  - 4T sensing
  - Ultrasonic Wire Bonding (wedge-type)
  - Vibrating Sample Magnetometry
  - Electronic measurements

2010 **Student Research Experience**, *Physics Department*,  
Politécnico di Milano, Milan, Italy.

*Research Project:* Measurement of Superconducting Transition in Type-II Superconducting Materials (YBCO)

*Project Lead:* Dr. Ermanno Pinotti — Politecnico di Milano

- Experimental
  - Cryogenic (LN) cooling
  - Measurement of zero electrical DC resistance
  - Transition temperature measurement
  - Meissner effect measurements
  - H-T curves and analysis
  - Josephson effect
  - Flux tubes
- Main Competencies
  - Superconductivity and superconductive materials
  - Thermocouples
  - 4T sensing
  - R-L Circuitry

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## Equipment Training & Experience

- R.F. & D.C. Magnetron Sputtering
- Vibrating Sample Magnetometry
- Inductively Coupled Plasma Reactive-Ion Etching (ICP-RIE)
- Ultrasonic Wire Bonding (wedge-type)
- Lock-in amplifiers
- Clean room procedures (class 100-1000)

## Computer skills

**Languages** MATLAB,  $\text{\LaTeX}$

**Tools** Origin, Abaqus (FEM), LabView,  $\text{\LaTeX}$ ,  
Microsoft Office Suite

## Spoken Languages

**Italian** Native Tongue

**English** Fluent (*2012, IELTS: 7.5 of 9.0*)  
*Sept. 2011 – Jul. 2012: Studies in Philadelphia, PA, USA*

**Spanish** Fluent  
*Summer 2010: Stay in Barcelona, Spain*  
*Nov. 2012 – Jul. 2013: Research work at UPM in Madrid, Spain*

## Personal Interests

**Energy** Nanoscale structures and materials for high-efficiency photovoltaic devices and energy storage applications.

**Physics** Quantum Mechanics, Magnetism and Spintronics, Superconductivity, Quantum Information, Photonics.

**Hobbies** Volunteering, Politics, Basketball, Soccer, Sailing, Culinary Arts, Guitar, Piano.