Brian Beatty

Curriculum Vitæ

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Education

2011-Present **Master's Degree Studies in Materials Science (Dual Degree)**, *Politecnico di Milano*, Milan, Italy.
Attended for academic year 2011-2012 as part of EAGLES International Exchange Program

2007-Present **Combined Degree (B.S./M.S.) in Materials Science (Major)**, *Drexel University*, Philadelphia, PA.
Cumulative GPA: 3.56
Previous Six Quarters GPA: 3.92

Master's thesis

Title *Atomic Layer Deposition of Perovskite Oxide Thin Films*

Supervisors Dr. Jonathan Spanier, *Drexel University, Philadelphia, PA, USA* Dr. Carlo Casari, *Politecnico di Milano, Milano, MI, Italy*

Description Atomic Layer Deposition (ALD) has been shown to be capable of depositing ultra-thin films (<100 nm) of perovskite oxides. These are technologically valuable due to their wide range of properties, ranging from ferroelectricity and ferromagnetism to superconductivity. With the use of ALD, it becomes possible to deposit thin and conformal coatings of these materials to three-dimensional surfaces with the ability to carefully control thickness with sub-nanometer resolution. Research work focuses on lead titanate ($PbTiO_3$) and bismuth ferrite ($BiFeO_3$).

Experience

Summer 2012 **Thesis Research**, *Universidad Politécnica de Madrid*, Madrid, Spain.
Three month period to be spent completing experiments and authoring final M.S. thesis document and defense presentation.

Fall, 2011 **Abstract Accepted to MRS**.
On results of oriented lead titanate thin film deposition via ALD onto single crystalline surfaces.

Spring, Summer 2011 **Cooperative Work Experience**, *MesoMaterials Laboratory*, Drexel University.
Three six month periods (Spring, Summer) of full-time work as a student researcher. Focused research on application of atomic layer deposition to ferroelectric oxide films.

2011 **Student Research**, *MesoMaterials Laboratory*, Drexel University.
XXXX designing and conducting experiments concurrently while attending classes. Primary goals: Utilizing statistics to improve experimental designs; Optimizing process conditions based on predictive modeling and thermodynamic simulation; Identification of alternative chemical precursors to alleviate operational limitations.

Spring, Summer 2010 **Cooperative Work Experience**, *MesoMaterials Laboratory*, Drexel University.
Three six month periods (Spring, Summer) of full-time work as a student researcher. Focused research on application of atomic layer deposition to ferroelectric oxide films.

2010 **Student Research**, *MesoMaterials Laboratory*, Drexel University.
XXXX designing and conducting experiments concurrently while attending classes. Primary goals: Utilizing statistics to improve experimental designs; Optimizing process conditions based on predictive modeling and thermodynamic simulation; Identification of alternative chemical precursors to alleviate operational limitations.

Spring, Summer 2009 **Cooperative Work Experience**, *MesoMaterials Laboratory*, Drexel University.
Three six month periods (Spring, Summer) of full-time work as a student researcher. Focused research on application of atomic layer deposition to ferroelectric oxide films.

2008-2009 **Student Research**, *MesoMaterials Laboratory*, Drexel University.
XXXX designing and conducting experiments concurrently while attending classes. Primary goals: Utilizing statistics to improve experimental designs; Optimizing process conditions based on predictive modeling and thermodynamic simulation; Identification of alternative chemical precursors to alleviate operational limitations.

Summer 2008 **STAR: Summer Research Experience**, *MesoMaterials Laboratory*, Drexel University.
Ten week period spent learning to organize and develop a personal research project. Focused on statistics-based design of experiments; data analysis using Matlab and Igor software packages and custom scripts; received training for and logged over 200 hours on characterization equipment, including: ellipsometry, scanning electron microscopy and EDS spectroscopy, X-Ray diffractometry, and Rutherford Backscattering Spectroscopy.

2007–2008 **Training in Atomic Layer Deposition**, *MesoMaterials Laboratory*, Drexel University.
Worked under graduate mentor Rahul Joseph researching application of advanced thin film deposition methods. Trained on operation and maintenance of ALD reactor,

Publications

April, 2012 **Shape-Controlled Vapor-Transport Growth of Tellurium Nanowires**, *Christopher J. Hawley, Brian R. Beatty, Guannan Chen, and Jonathan E. Spanier*, J. Crystal Growth & Design, **ASAP**.

Equipment Training

Thin Film Deposition Atomic Layer Deposition (ALD), Chemical Vapor Deposition (CVD), Pulsed Laser Deposition (PLD), Molecular Beam Epitaxy (MBE).

Film Quantification X-Ray Diffraction (XRD), X-Ray Reflectivity (XRR), Scanning Electron Microscopy (SEM), Energy-Dispersive X-Ray Spectroscopy (EDXS), X-Ray Fluorescence (XRF), Ellipsometry, Rutherford Backscattering Spectroscopy.

Chem., Therm. Analysis Fourier-Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Thermo-gravimetric Analysis (TGA).

Computer skills

Languages MATLAB, Maple, LaTeX

Tools Origin, Igor, FilmWizard, Microsoft Office Suite, Adobe Suite

Platforms Mac OS, Windows

Spoken Languages

English **Native**

Spanish **Speaking: Moderate**
Reading: Elementary
Writing: Elementary

Italian **Speaking: Elementary**
Reading: Elementary
Writing: Elementary

Interests

Electronics Design and synthesis of novel materials for IC applications, particularly those leveraging unique quantum effects

Energy Nanoscale structures for high-efficiency photovoltaic devices.

Culinary Arts Personal hobby.