

# AVNI A. ARGUN

Department of Chemical Engineering  
Massachusetts Institute of Technology  
Room 66-525, Cambridge, MA 02139 USA

[argun@mit.edu](mailto:argun@mit.edu)  
Phone: +1 (352) 665-1315  
Fax: +1 (617) 258-8992

---

## EDUCATION

### Ph.D. in Chemistry

Department of Chemistry, University of Florida, Gainesville, Florida (GPA: 3.96/4.00)

Advisor: *Professor John R. Reynolds*

Dissertation Title: "*Patterning of Conjugated Polymers for Electrochromic Devices*" ([pdf](#))

December 2004

### B.S. in Chemistry

Department of Chemistry, Bilkent University - Ankara, Turkey (GPA: 3.33/4.00)

June 1999

## HONORS AND AWARDS

Finalist Winner at the Ignite Clean Energy Competition – *Team DyPol* (10 chosen among 140 teams) 2009

Semifinalist at the MIT 100K Entrepreneurship Competition – *Technical Team Lead* 2009

Recipient of the Council for the Arts Grant (Electrochromic Responsiveness), MIT ([Project CROMA](#)) 2009

Honorarium to Participate ICMAT 2007 (\$3,000) – *NTU, Singapore* 2007

Stasch Award for Excellence in Scientific Publication – *University of Florida* 2004

Outstanding Academic Achievement – *University of Florida* (8 chosen among 400 students) 2003

Fellowship for the Young Scientists – *Turkish National Council for Science and Technology, Turkey* 1995 - 99

## EXPERIENCE

### Post Doctoral Associate

Department of Chemical Engineering, MIT

Supervisor: *Professor Paula T. Hammond*

- Developed a highly conductive and methanol-resistant membrane from water-soluble polymers using the layer-by-layer assembly (LbL) technique. Incorporated this membrane into a direct-methanol fuel cell; *improved the performance by over 50%* ([The Economist](#)).
- Scaled-up the LbL process for rapid construction of membranes ([Technology Review](#)).
- Demonstrated the use of polyphosphazene solid-state electrolytes for batteries ([MIT News](#)).
- Skilled in electrochemical engineering, functionalization of polymers, aqueous layer-by-layer processing, carbon nanotube composites, dye-sensitized solar cells, fuel cells.

May 2006 - Present

### Post Doctoral Associate

Department of Materials Science & Engineering, University of Florida

Supervisor: *Professor Paul H. Holloway*.

- Designed and fabricated a *dual functioning hybrid electroluminescent/electrochromic device*.
- Developed AC driven light-emitting thin film devices based on lanthanide doped ZnS.
- Skilled in light-emitting diodes/cells, RF sputtering, high vacuum thin film deposition.

January 2005 - April 2006

### Research Assistant

Department of Chemistry, University of Florida

Advisor: *Professor John R. Reynolds*.

- Studied non-lithographic patterning of display devices based on conducting polymers.
- Developed line patterning to form color-matching electrodes for lateral display devices.
- Demonstrated *the first truly all-organic electrochromic device*.
- Developed a novel method to form *back-side electrical contacts* on electrodes that increases the active space and allows for vertically integrated electronic devices.
- Skilled in prototype device engineering, conducting polymers, electrochemical characterization, electrochromic display devices, polymer LEDs, and electrode patterning.

2001 - 2004

### Summer Intern

Fako Pharmaceuticals, Istanbul, Turkey.

- Worked in the quality control department. Skilled in using HPLC, GC, and Viscometer.

1998

### Undergraduate Researcher

Department of Chemistry, Bilkent University, Ankara, Turkey.

- Studied the surface modification of polypropylene with contact angle measurements and XPS.

1997 - 1999

## PATENTS

- **Argun, A. A.**; Cardoso, D. “*CROMA: A Technology for Interactive and Organic Smart Windows*” US provisional patent app. **2010**.
- Hammond, P.T.; **Argun, A. A.**; Ashcraft, J.N. “*Highly Conducting Solid State Ionics for Electrochemical Systems and Methods of Fabricating Them Using Layer-By-Layer Technology*” US patent app. 61/025,096, **2009**. ([html](#))
- Reynolds, J.R.; **Argun, A. A.**; Berard, M.; Aubert, P-H. “*Device for Contacting Patterned Electrodes on Porous Substrates*” US 7,333,257, **2004**. ([html](#))
- Reynolds, J.R.; Zong K.; Schwendeman I; Sonmez G.; Schottland P.; **Argun A. A.**; Aubert P-H. “*Electrochromic Polymers and Polymer Electrochromic Devices*” US 6,791,738, **2003**. ([html](#))

## SELECTED PUBLICATIONS ([Extensive List](#))

- **Argun, A. A.**; Ashcraft, J. N.; Herring, M.; Lee, D. K. Y.; Allcock, H. R.; Hammond, P. T. “*Ion Conduction and Water Transport in Polyphosphazene Multilayers*” *Chemistry of Materials*, (**2010**), 22(1), 226-232 ([DOI](#)).
- Kim, B.-S.; Gao, H.; **Argun, A. A.**; Matyjaszewski, K.; Hammond, P.T. “*All Star Polymer Multilayers as pH-Responsive Nanofilms*” *Macromolecules*, (**2009**), 42(1), 368-375. ([DOI](#))
- **Argun, A. A.**; Ashcraft, J.N; Hammond, P.T. Law “*Highly Conductive, Methanol Resistant Polyelectrolyte Multilayers*” *Advanced Materials*, (**2008**), 20(8), 1539-1543. ([DOI](#))
- DeVito, D. M; **Argun, A. A.**; Law, E.; Davidson, M. R.; Puga-Lambers, M.; Holloway, P. H. “*Effects of processing parameters on electroluminescence of RF magnetron sputter deposited ZnS:ErF<sub>3</sub>*” *Journal of Vacuum Science and Technology A*, (**2007**), 25(2), 225-231. ([DOI](#))
- **Argun, A. A.**; Reynolds, J. R. “*Line Patterning for Flexible and Laterally Configured Electrochromic Devices*” *Journal of Materials Chemistry* (**2005**), 15(18), 1793 - 1800. ([DOI](#))
- **Argun, A. A.**; Berard, M.; Aubert, P.-H.; Reynolds, J.R. “*Back-Side Electrical Contacts for Patterned Electrochromic Devices on Porous Substrates*” *Advanced Materials* (**2005**), 17(4), 422-426. ([DOI](#))
- **Argun, A. A.**; Aubert, P.-H.; Thompson, B.C.; Schwendeman, I.; Gaupp, C.L.; Hwang, J.; Pinto, N.J.; Tanner, D.B.; MacDiarmid, A.G.; Reynolds, J.R. “*Multi-Colored Electrochromism In Polymers: Structures And Devices*” *Chemistry of Materials* (**2004**), 16(23), 4401-4412 ([DOI](#))
- **Argun, A. A.**; Cirpan A.; Reynolds J.R. “*The First Truly All-Polymer Electrochromic Devices*” *Advanced Materials*, (**2003**), 15(16), 1338-1341. ([DOI](#))

## SELECTED PRESENTATIONS ([Extensive List](#))

- 238<sup>th</sup> American Chemical Society National Meeting. Washington, DC August 2009  
Oral Presentation “**Highly Conductive Polyelectrolyte Multilayers for Fuel Cell Membranes**”
- AIChE Annual Meeting. Philadelphia, PA November 2008  
Oral Presentation “**Polyelectrolyte Multilayers for Direct-Methanol Fuel Cells**”
- International Conference on Materials for Advanced Technologies (ICMAT), Singapore July 2007  
Keynote Presentation “**Layer-by-Layer Assembly of Functional Thin Films for Electrochemical Devices**”
- Materials Research Society Spring Meeting. San Francisco, CA March 2005  
Oral Presentation: “**Infrared Electroluminescence from Zinc Sulfide Doped with Rare Earth Fluorides**”
- 227<sup>th</sup> American Chemical Society National Meeting. Anaheim, CA March 2004  
Oral Presentation: “**Electrochromic Polymers for Patterned Devices**”
- 5<sup>th</sup> International Meeting on Electrochromism (IME-5). Denver, CO August 2002  
Oral Presentation: “**Electrochromic Devices Based on Dual Conducting Polymers**”

## SKILLS

- **Instrumental:** Layer-by-Layer Assembly, UV-Vis-NIR Spectroscopy, Optical Microscopy, Scanning Electron Microscopy, Contact Profilometry, Thermogravimetric Analysis, Potentiostat, Electrochemical Impedance Spectroscopy, Four-Probe Conductivity, Fuel Cell (Hydrogen and Methanol) Construction and Testing, Polymer Synthesis, Gel Permeation Chromatography, RF Magnetron/DC Sputtering, Vacuum Metal Evaporation.
- **Computer:** Labview, Minitab (Design of Experiments), Microsoft Office (Word, Excel, Powerpoint), MATLAB, Origin, ChemBioDraw, EndNote, Gamry Echem Analyst, ZPlot, Corrware.