

# Andrea C. Charif

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## PROFILE

PhD Candidate in Polymer Science with a Chemical Engineering background. Experience in the preparation and characterization of polymer composite materials using liquid crystals to improve piezoelectric properties of polyisobutylene-based thermoplastic elastomers; post-polymerization modification and characterization of polyisobutylene-based thermoplastic elastomer for ion exchange membranes; application of polymer coatings by solution casting and spin casting on different substrates for diverse applications; and drug release studies from polyisobutylene-based drug eluting fiber mats. Interests include areas of composite materials for alternative energy applications, smart materials for novel applications, materials for biomedical applications and polymer characterization.

## Skills base

- Polymer Characterization: Thermal Analysis: TGA, DSC; Mechanical testing: Universal Testing Machine; GPC, NMR, UV, Infrared Spectroscopy, Optical Microscopy, Interferometric Microscopy, Scanning Electron Microscopy (SEM), Impedance Spectroscopy.
- Preparation of Composite Materials: Electrospinning, Solution Casting, Spin Casting, Compression Molding.
- IT: Microsoft Office (Word, Excel, PowerPoint); spectra analysis software: ACD/NMR Processor, ASTRA®; image analysis software: Image-Pro, Image J; programming skills.
- Great team-worker, excellent inter-personal and communications skills, rapid adaptability to new problem-solving and new locations, time-efficient and leadership skills.
- Languages: English (Full proficiency), Spanish (Full proficiency)

## EDUCATION

The University of Akron, Akron, OH  
PhD. Polymer Science  
Expected graduation: December 2014  
Advisor: Dr. Judit Puskas  
Cumulative GPA: 3.4

National University of Colombia, Bogotá D.C., Colombia  
BSc. Chemical Engineering  
Advisor: Dr. Jairo Perilla  
Cumulative GPA: 3.4

## **EMPLOYMENT AND RESEARCH EXPERIENCE**

### **The University of Akron, Akron, OH, USA**

Research Assistant

- Preparation and characterization of a piezoelectric thermoplastic elastomer containing bent-core liquid crystals.
- Sulfonation and characterization of arborescent SIBS as proton exchange membranes.
- Investigation of drug (Aspirin and Zafirlukast) release from drug eluting polymer fibermats.
- Coating of pressure sensors with biocompatible polymer for in vivo implantation.

### **National University of Colombia, Bogota D.C., Colombia**

Teaching assistant

- Operated and trained users of the universal testing machine for testing of tensile stress and compressive strength of materials.
- Developed an operation manual for the universal testing machine based on ASTM D 638:2002 “Standard Test Method for Tensile Properties of Plastics”.
- Assisted courses on tensile testing of polymers taught to industry and to other institutions.
- Operated and trained users of the thermogravimetric analysis (TGA) instrument.
- Designed the website for the Polymer Research Group BIOMATUN.

### **Research Experience for Undergraduates in Polymer Science and Polymer Engineering - Internship Program, Akron, OH, USA**

Intern

The University of Akron, Department of Polymer Science

- Investigated a fundamental question within the disciplines of polymer science and polymer engineering including chemistry, physics, characterization, and biomaterials. “Synthesis of Vinyl-Ethylbenzocyclobutenyl Ether and its Copolymers with Styrenes”.

### **Flexo Spring S.A., Bogota D.C., Colombia**

Quality Control Analyst

- Conducted an assessment of the technical and commercial relationships between Flexo Spring S.A. and its major customers. (Compliances, non-compliance, returns, causes, etc.)
- Determined the main variables of the production process that influence the technical specifications of the finished product.
- Carried out the collection of product specifications at different stages of the production process for all references provided by Flexo Spring S.A. to its major customers.
- Defined new product specifications based on the data collected.
- Established a protocol for the development of trade and quality agreements between Flexo Spring S.A. and its major customers.

**National University of Colombia**, Bogota D.C., Colombia

Research assistant

- Studied the biodegradation of films of polyvinyl alcohol (PVA)-starch in aqueous medium under aerobic conditions.
- Prepared polyvinyl alcohol (PVA)-starch films by solution casting.
- Characterized polyvinyl alcohol (PVA)-starch and its biodegradation process using microscopy, thermal analysis and infrared spectroscopy (FTIR).
- Designed a system to monitor the production of biogenic CO<sub>2</sub> during the biodegradation process.

## **PUBLICATIONS AND PRESENTATIONS**

Charif, A.; Diorio, N.; Fodor-Csorba, K.; Puskas, J. E.; Jakli, A. A Piezoelectric Thermoplastic Elastomer Containing a Bent-Core Liquid Crystal. *RSC Adv.*, **2013**, 3, 17446–17452.

*Contribution to Book*: Puskas, J.E. Introduction to Polymer Chemistry: A Biobased Approach. ISBN: 978-1-60595-030-3. DEStech Publications Inc. **2014**. 334 pages.

Charif A., Puskas, J., Antal, J., Morvan, J. Model Experiments for Biosensor Applications: Bent-core Liquid Crystal in a Biocompatible Thermoplastic Elastomer. *Presented at*:

- Rubber Division's 10<sup>th</sup> Annual Student Colloquium & Poster Session at Rubber Expo & Advanced Materials in Health Care and 184<sup>th</sup> Technical Meeting & Educational Symposium. Cleveland, OH, October **2013**.
- 10<sup>th</sup> Thermoplastic Elastomers Topical Conference, Akron, OH, September **2012**.
- ACS National Meeting and Exposition, Philadelphia, PA, August **2012**.
- ACS Summer School on Green Chemistry and Sustainable Energy. Golden, CO, June **2012**.
- Rubber Division's 8<sup>th</sup> Annual Student Colloquium & Poster Session at Rubber Expo & Advanced Materials in Health Care and 180<sup>th</sup> Technical Meeting & Educational Symposium. Cleveland, OH, October **2011**.
- Third Semi-Annual Symposium on Biomaterials, Department of Polymer Science, the University of Akron. Akron, OH, October **2011**.
- International Symposium on Ionic Polymerizations, IP'11, International Union of Pure & Applied Chemistry, IUPAC. Akron, OH, July **2011**.

Charif A., Baker J., Pugh C. Synthesis of Vinyl-Ethylbenzocyclobutenyl Ether and its Copolymers with Styrenes. 5<sup>th</sup> annual Northeast Ohio Undergraduate Research Conference. Akron, OH, **2008**.

Charif, A.; Quintero, S.; Perilla, J.; Algecira, N. Evaluation of biodegradability of PVA-starch films in aqueous media. *Conference Proceedings: XXIV Chemical Engineering National Meeting* **2007**, Cali, Colombia.

**AWARDS**

Selected by a review panel to attend the ACS Summer School on Green Chemistry and Sustainable Energy at Colorado School of Mines, Golden, CO, **2012**.

Travel Award from The University of Akron, Department of Polymer Science to attend the 244<sup>th</sup> ACS National Meeting and Exposition, Philadelphia, PA **2012**.

Outstanding Woman Student Award. The University of Akron, Association of Women in Higher Education. **2010**

**PROFESSIONAL AFFILIATIONS AND EXTRACURRICULAR ACTIVITIES**

**American Chemical Society, ACS Member**, 2010-present.

**ACS Rubber Division Member**, 2010-present.

**ACS Rubber Division Student Chapter President**, 2013-2014.

**Polymer Science Student Organization Webmaster**, 2010-2011.

**Society for Women Engineers** Volunteer for fundraising, professional development and graduate student committee at The University of Akron Student Section, 2012-13.

**International Symposium on Ionic Polymerization (IP' 11)**, Volunteer at Organizing Team, Akron, OH, USA, July 2011.

**Society of Hispanic Professional Engineers SHPE Conference 2010** Student Recruiting, Cincinnati, OH 2010.

**Women for Women International** Sponsor, 2012-13.

**The Humane Society of the United States** Volunteer, 2012.

**Community Service** Volunteer at Science Olympiads, make a difference day, meal packing, animal rescue. 2011, 2012, 2013.

**III Symposium of Chemical Engineers "A Good Environment"** Volunteer at Organizing Committee, Bogota D.C., Colombia 2008.

**Online courses:** Principles of Economics, Introduction to Sustainability, Sustainability of Food Systems, Social Psychology, 2013.