

# HORACIO LOPEZ MARQUES

## 1 INDUSTRY EXPERIENCE:

---

**Undergraduate internship** February-June 2016  
Zoltek de Mexico (Toray group)  
-Project: statistical studies for the reduction of variability in a carbon fiber product

## 2 RESEARCH EXPERIENCE:

---

**Graduate Research Assistant** September 2019-Present  
University of Texas at Austin  
- Carbon Molecular Sieve (CMS) membrane preparation for gas separations  
- Direct carbon capture using ion exchange materials through moisture swing processes  
- Pure gas solubility, permeability and diffusivity in polymeric and CMS membranes  
- Mix gas permeability in polymeric and CMS membranes  
- Mix gas solubility in polymeric and CMS membranes  
- Water vapor solubility, permeability and solubility in polymeric and carbon membranes  
- Gas Chromatography  
- X-Ray Diffraction for membrane characterization

**Internship** November 2017-February 2018  
Institute of Science and Technology of Polymers (ICTP) of the Superior Council of Scientific Research (CSIC). Madrid, Spain.  
-Synthesis of a macro RAFT agent for controlled polymerization.  
-Characterization of the macro RAFT agent by Nuclear Magnetic Resonance (NMR) and Gel Permeation Chromatography (GPC).  
-Characterization of gradient copolymers by NMR, GPC, Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA), Universal testing machine (UTM).

**Internship** May-July 2015  
University of Texas at Dallas Summer Research Program  
- Characterization of 3D printing polymers by capillary rheology and tensile test.

**Undergraduate Research Assistant** January 2015-July 2016  
University of Guadalajara, Mexico  
- Synthesis of polyurethane composites.  
- Red 40 dye removal from aqueous solutions by column percolation.  
- Aqueous solution characterization by UV-Vis Spectroscopy.

### **3 PRESENTATIONS & PUBLICATIONS:**

---

Horacio Lopez Marques, Kristofer Gleason, Rita Sulub Sulub, Manuel Aguilar Vera, Benny Freeman, Manish Kumar. Water vapor transport in carbon molecular sieve membranes fabricated from polyimide precursors. *Journal of Membrane Science*, 2023, in preparation.

Hyeonji Oh, Yu-Ming Tu, Laximicharan Samineni, Sophie De Respino, Behzad Mehrafrooz, Joshi Himanshu, Lynnica Massenburg, Horacio Lopez Marques, Nada Elessawy, Woochul Song, Harekrushna Behera, Veda Sheersh Boorla, Yi-Chih Lin, Costas Maranas, Aleksei Aksimentiev, Benny Freeman, Manish Kumar. Dehydrated biomimetic membranes for Breathable protective fabrics with skin-like structure and function. *Journal of Membrane Science*, 2023, in preparation.

Hoda Shokrollahzadeh Behbahani, Husain Mithaiwala, Horacio Marques Lopez, Winston Wang, Benny D. Freeman, Matthew D. Green. Quaternary Ammonium Functionalized Poly(Arylene Ether Sulfone) Random Copolymers For Direct Air Capture. *ACS Environmental Science and Tech*, 2023, in preparation.

Jennifer Wade, Horacio Lopez Marques, Winston Wang, Benny Freeman. Moisture-Driven CO<sub>2</sub> Pump for Direct Air Capture, *Journal of Membrane Science*, 2023, in preparation.

Poster presentation: “Remoción de colorante Rojo 40 mediante percolación en columna utilizando compositos de espuma de poliuretano-quitosana”. (Removal of Red 40 dye by column percolation using polyurethane-chitosan foam composites). IV Congreso de ciencia, innovación y tecnología para el desarrollo de Jalisco (IV Congress of science, innovation and technology for the development of Jalisco), 2016.

Conference article: XXVII Congreso Nacional de la Sociedad Polimérica de México (XXVII National Congress of the Polymeric Society of Mexico): “Adsorción del colorante rojo 40 utilizando compositos de poliuretano-quitosana y poliuretano-sulfato de quitosana”. (Adsorption of Red 40 dye using polyurethane-chitosan and polyurethane-chitosan sulfate composites). San Miguel Allende Guanajuato, 2015, pages 107-112.

### **4 SCHOLARSHIPS AND AWARDS:**

---

Eastman Chemical Company Fellowship, 2021.

Fulbright-García Robles Scholarship recipient, 2019-2022.

Conacyt Graduate National Scholarship, 2016-2018.

Graduated with honors with the best GPA in the Bachelor of Science in Chemical Engineering, Universidad de Guadalajara. 2016.

## **5 SKILLS:**

---

Languages: Spanish (Native), English.

Effective written and oral communication

Effective use of basic (Microsoft Office) and specialized software (Image J, Kaleida graph, Wolfram Mathematica).

## **6 EDUCATION:**

---

University of Texas at Austin, USA. August 2019-December 2023 (Expected)

PhD in Chemical Engineering

Thesis: "Effect of humidity on the gas separation performance of Carbon Molecular Sieve membranes".

Universidad de Guadalajara, Mexico. August 2016-December 2018.

Master of Science in Chemical Engineering, GPA: 90/100

Thesis: "Síntesis y comparación de propiedades termomecánicas de copolímeros con gradiente de alimentación sintetizados vía radicalica por desactivación reversible y radicales libres" (Synthesis and comparison of thermomechanical properties of copolymers with feed gradient synthesized by free radical and reversible deactivation radical polymerization).

Universidad de Guadalajara, Mexico. August 2011-July 2016.

Bachelor of Science in Chemical Engineering, GPA: 97/100

Thesis: "Eliminación del colorante Rojo 40 de soluciones acuosas utilizando sulfato de quitosana y compositos de poliuretano-quitosana" (Elimination of red 40 dye from aqueous solutions using chitosan sulfate and polyurethane-chitosan composites).