

# Ellis R. Crabtree

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## EDUCATION

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**Johns Hopkins University** – *Baltimore, Maryland* 05/2024 (expected)  
Doctor of Philosophy (Ph.D.)  
**Department:** Chemical and Biomolecular Engineering  
**Advisor:** Professor Yannis G. Kevrekidis

**The University of Alabama** – *Tuscaloosa, Alabama* 05/2019  
Bachelor of Science in Chemical Engineering; *Magna Cum Laude, University Honors, ChBE Honors*  
**Major:** Chemical Engineering  
**Minor:** Mathematics

## WORK EXPERIENCE

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**Georgia-Pacific LLC** – *Pennington, Alabama* 01/2016 – 08/2017  
<https://gp.com> (3 Co-op rotations)  
Process Engineering Co-op

- Created new process guidelines and limits to improve efficiency of black liquor solids flow from the pulp mill (estimated savings of \$1MM by time of departure)
- Managed various installation and repair projects regarding air and steam lines during mill outage
- Ran and managed audits and trials around various process systems
- Updated current and created new Standard Operating Procedures for multiple efficiency tests

**The University of Alabama** – *Tuscaloosa, Alabama* 01/2015 – 07/2019  
<https://ua.edu>  
Undergraduate Research Assistant

- Utilize molecular simulations to investigate the selective adsorption properties of ionic polyimides and ionic polyimide/ionic liquid composites
- Generate and analyze molecular dynamics and structural analysis code
- Create three-dimensional representations of molecular simulation data utilizing design software and 3D printing

## PROFICIENCIES

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|----------------------|---|
| • Platforms          | Windows, Linux, OS X                            |
| • Programming        | Fortran, Python, HTML                           |
| • Important Packages | Pytorch, Tensorflow, OpenMM, GROMACS, Cassandra |
| • Language           | English, Portuguese                             |

## PUBLICATIONS AND PRESENTATIONS

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### **Molecular Simulation of Ionic Polyimides and Composites with Ionic Liquids as Gas-Separation Membranes**

Asghar Abedini, **Ellis Crabtree**, Jason E. Bara, C. Heath Turner

*Langmuir* **2017** 33 (42), 11377-11389

DOI: 10.1021/acs.langmuir.7b01977

### **Molecular Analysis of Selective Gas Adsorption Within Composites of Ionic Polyimides and Ionic Liquids as Gas Separation Membranes**

Asghar Abedini, **Ellis Crabtree**, Jason E. Bara, C. Heath Turner

*Chemical Physics*, Volume 516, **2019**, pp. 71-83

DOI: 10.1016/j.chemphys.2018.08.039

### **Molecular Transport Behavior of CO<sub>2</sub> in Ionic Polyimides and Ionic Liquid Composite Membrane Materials**

Joanna Szala-Bilnik, Asghar Abedini, **Ellis Crabtree**, Jason E. Bara, C. Heath Turner

*The Journal of Physical Chemistry B*, **2019**, 123 (34), 7455-7463

DOI: 10.1021/acs.jpcc.9b05555

### **Solubility and Diffusivity of CO<sub>2</sub> in Ionic Polyimides with [C(CN)<sub>3</sub>]<sup>x</sup>[OAc]<sup>1-x</sup> Anion Composition**

Joanna Szala-Bilnik, **Ellis Crabtree**, Asghar Abedini, Jason E. Bara, C. Heath Turner

*Computational Materials Science*, Volume 174, **2020**, 109468, ISSN 0927-0256,

DOI: 10.1016/j.commatsci.2019.109468

### **GANs and Closures: Micro-Macro Consistency in Multiscale Modeling**

**Ellis R Crabtree**, Juan M Bello-Rivas, Andrew L. Ferguson, Ioannis G. Kevrekidis

*arXiv preprint arXiv:2208.10715* (2022).

**University of Alabama Undergraduate Research Conference – Tuscaloosa, Alabama** **March 2015**

- Poster, “Physical Representations of Molecular Simulation Data”

**2017 AIChE Annual Meeting – Minneapolis, Minnesota** **October 2017**

- Poster, “Molecular Simulation of Ionic Polyimides and Ionic Liquid Composites for Gas Separation”

**2017 AIChE Annual Meeting – Minneapolis, Minnesota** **October 2017**

- Talk, “Gas Adsorption Behavior in Ionic Polyimide Composite Membranes”
- *Contributed – not main presenter*

**2018 AIChE Annual Meeting – Pittsburgh, Pennsylvania** **October 2018**

- Talk, “Molecular Simulation of Ionic Polyimides and Ionic Liquid Composite Membranes for Gas Selectivity and Adsorption”
- *Contributed – not main presenter*

**2021 AIChE Annual Meeting – Boston, Massachusetts** **November 2021**

- Talk, “Something Old, Something New: Generative Adversarial Approaches to Conditional Sampling in Complex System Simulations”

## HONORS AND AWARDS

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### **Randall Outstanding Undergraduate Research Award**

- Recognizes outstanding undergraduate research conducted by students at the University of Alabama

### **DOE SCGSR Fellowship**

- Fellowship to sponsor research at a DOE national lab

### **JHU ChemBE Department Graduate TA award**

- Awarded to outstanding graduate student TAs in the ChemBE department at Johns Hopkins University

### **University of Alabama Presidential Merit Scholarship**

- Full academic scholarship provided by the University of Alabama

### **Omega Chi Epsilon ( $\Omega\chi\epsilon$ )**

- Chemical engineering honor society for the top percentile of chemical engineering students at the University of Alabama

### **Gamma Sigma Epsilon ( $\Gamma\Sigma\epsilon$ )**

- Chemistry honor society for the top percentile of chemistry students at the University of Alabama

### **Phi Eta Sigma ( $\Phi\eta\Sigma$ )**

- First year honor society that recognizes students' outstanding academic achievement in their first year of university