



# Jacob Boes

*Curriculum Vitae*

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## WORK EXPERIENCE

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**PhD Candidate in Chemical Engineering** 2012-present  
*Carnegie Mellon University – Pittsburgh, PA*

- Research on first principles catalysis and surface science of transition metal alloys with Prof. J. Kitchin
- Strong focus on effective teaching methods in the field of engineering
- Developing tools for more efficient means of sharing reproducible research

**Paper Mill Technical Intern** 2010-2011  
*Domtar Paper Corporation – Rothschild, WI*

- Managed hourly workers for plant projects
- Performed product testing and ensured enforcement of product specifications
- Designed software for efficiency of data entry, storage, and retrieval

## EDUCATION

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**BS Chemical Engineering** 2007-2012  
*Michigan Technological University – Houghton, MI*  
Summa Cum Laude. Academic/Research advisors: D. Shonnard, T. Rogers, and J. King  
Minor in Hydrogen Fuel Cell Technologies

## PUBLICATIONS

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5. Jacob R. Boes, Mitchell C. Groenenboom, John A. Keith and John R. Kitchin, “[Neural network and ReaxFF comparison for Au properties](#)”, *Int. J. Quantum Chem.* **116**(13), 979 (July 2016).
4. John Michael, Ethan L. Demeter, Steven M. Illes, Qingqi Fan, [Jacob R. Boes](#), and John R. Kitchin, “[Alkaline Electrolyte and Fe Impurity Effects on the Performance and Active-phase Structure of NiOOH Thin Films for OER Catalysis Applications](#)”, *J. Phys. Chem. C* **119**(21), 11475 (May 2015).
3. Gamze Gumuslu, Petro Kondratyuk, [Jacob R. Boes](#), Bryan David Morreale, James B. Miller, John R. Kitchin, and Andrew J. Gellman, “[Correlation of Electronic Structure with Catalytic Activity: H<sub>2</sub>-D<sub>2</sub> Exchange across Cu<sub>x</sub>Pd<sub>1-x</sub> Composition Space](#)”, *ACS Catalysis* **5**(5), 3137 (2015).

2. [Jacob R. Boes](#), Peter Kondratyuk, Chunrong Yin, James B. Miller, Andrew J. Gellman, and John R. Kitchin, “[Core level shifts in Cu-Pd alloys as a function of bulk composition and structure](#)”, *Surface Science* **640**, 127 (Oct 2015).
1. [Jacob R. Boes](#), Gamze Gumuslu, James B. Miller, Andrew J. Gellman, and John R. Kitchin, “[Estimating Bulk-Composition-Dependent H<sub>2</sub> Adsorption Energies on Cu<sub>x</sub>Pd<sub>1-x</sub> Alloy \(111\) Surfaces](#)”, *ACS Catalysis* **5(2)**, 1020 (2015).

## CONFERENCE PARTICIPATION

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### *Practical Data Sharing for Molecular Simulation:*

2. Midwest Theoretical Chemistry Conference, Pittsburgh, 6/9/16 (Poster)
1. International Open Access Week, Pittsburgh, 10/29/15 (Poster)

### *Neural Network and ReaxFF Comparison for Au Properties:*

1. CMU Simulators Meeting, Pittsburgh, 5/25/16 (Talk)

### *Core level shifts in Cu-Pd alloys as a function of bulk composition and structure:*

4. Annual Innovation with Impact Research Exhibition, Pittsburgh, 4/7/16 (Poster)
3. AIChE Annual Meeting, Salt Lake City, 11/10/15 (Talk)
2. 24th Meeting of the North American Catalysis Society, Pittsburgh, 6/14/15 (Talk)
1. CMU Simulators Meeting, Pittsburgh, 5/20/15 (Talk)

### *Estimating Bulk Composition Dependent H<sub>2</sub> Dissociative Adsorption Energies on Cu<sub>x</sub>Pd<sub>1-x</sub> Alloy (111) Surfaces:*

5. AIChE Annual Meeting, Atlanta, 11/18/14 (Talk)
4. Annual ChEGSA Symposium, Pittsburgh, 10/17/14 (Talk)
3. CMU Simulators Meeting, Pittsburgh, 6/10/14 (Talk)
2. Pittsburgh-Cleveland Catalysis Society Conference, Pittsburgh, 6/2/14 (Talk)
1. Annual ChEGSA Symposium, Pittsburgh, 10/11/13 (Poster)

### *Production of Purified Hydrogen as an Alternative Energy Source:*

1. Andrew Carnegie Society, Pittsburgh, 4/12/14 (Poster)

## AWARDS

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- 2015 ACS Summer Institute Certificate of Innovation
- 2015 Mark Dennis Karl Outstanding Graduate Teaching Assistant Award
- 2015 Bertucci Graduate Fellowship
- 2014 Graduate Student Assembly Outstanding Representative Award
- 2007 Michigan Technological University Presidential Scholarship

## TEACHING

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*@ Carnegie Mellon University, Chemical Engineering Dept.:*

- Spring 16: **Mathematical Software TA**
- Spring 14, 15: **Molecular Simulation TA**
- Fall 13, 14: **Chemical Reaction TA**
- Spring 13: **Intro to Chemical Engineering TA**
- Fall 12: **Undergraduate Thermodynamics TA**

*@ Michigan Technological University, Chemistry Dept.:*

- Fall 08, 09, 11 Spring 09, 10, 12: **Chemistry Learning Center Coach**
  - Tutored undergraduates in chemistry and good studying skills

## SERVICE AND OUTREACH

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- 2015-2016 Pittsburgh-Cleveland Catalysis Society – Secretary
- 2015 CMU Chemical Engineering Graduate Student Association – Symposium Chair
- 2014 CMU Graduate Student Assembly (GSA) – Service Committee Chair & Founder
- 2014 CMU Chemical Engineering Graduate Student Association – Vice President
- 2013 CMU Chemical Engineering Graduate Student Association – GSA Representative

## PROGRAMMING

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Python • LaTeX • Linux shell scripting • Matlab • MathCAD • Visual Basic • UniSim