

Brian M. Tackett

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3260 Henry Hudson Parkway
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EDUCATION

UNIVERSITY OF PITTSBURGH, Pittsburgh, PA

Aug. 2009 – Dec. 2013

B.S. Chemical Engineering, Chemistry Minor, Overall GPA: 3.97

COLUMBIA UNIVERSITY, New York City, NY

Sept. 2014 – Present

Ph. D. Candidate, Chemical Engineering, Overall GPA: 3.94

Relevant Coursework

- Advanced Chemical Kinetics
- Math Methods in Chem. Eng.
- Advanced Chem. Eng. Thermodynamics
- Chem. Eng. Applications of Electrochemistry

RESEARCH EXPERIENCE

DOE SCGSR AWARDEE

Brookhaven National Lab – Dr. Radoslav Adzic & Dr. Jinguang Chen

Nov. 2017 – Oct. 2018

- Investigate transition metal nitride electrocatalysts for water electrolysis
- Synthesize transition metal nitride thin films using PVD and ALD
- Perform density functional theory binding energy calculations on nitride surfaces
- Develop correlations between DFT calculations and model surface electrochemical measurements

PRESIDENTIAL FELLOW

Sept. 2014 – Present

Columbia University – Dr. Jinguang Chen

- Investigate novel catalysts for fuel cell and water electrolysis applications
- Synthesize metal modified carbide thin films using physical vapor deposition
- Perform X-ray photoelectron spectroscopy for material characterization
- Conduct electrochemical testing to evaluate reaction kinetics

NATIONAL SCIENCE FOUNDATION REU SCHOLAR

May – Aug. 2013

Stony Brook University – Dr. Jason Trelewicz

- Investigated novel nanocrystalline tungsten compounds for self sharpening projectiles
- Interacted with primary investigator and graduate students to create cohesive research plan
- Performed over 15 high-energy ball mill experiments for material synthesis
- Characterized materials using SEM and synchrotron X-ray diffraction
- Implemented thermodynamic model in MATLAB script

UNDERGRADUATE RESEARCH ASSISTANT

Aug. 2012 – Dec. 2013

University of Pittsburgh – Dr. Gotz Vesper

- Carried out PBR and TGA experiments for chemical looping combustion research
- Synthesized, characterized, and tested nanoscale materials for chemical looping partial oxidation of methane applications

PUBLICATIONS

- **B. M. Tackett**, W. Sheng and J. G. Chen. "Opportunities and Challenges in Utilizing Metal-modified Transition Metal Carbides as Low-cost Electrocatalysts." *Joule*. 2017, **1** 253-263.
- W. Wan, **B. M. Tackett** and J. G. Chen, "Reactions of C1 molecules on carbide and metal modified carbide surfaces." *Chem. Soc. Rev.* 2017. **139**, 9739-9754.
- Q. Zhang, **B. M. Tackett**, Q. Wu and J. G. Chen, "Trends in Hydrogen Evolution Activity of Metal-Modified Molybdenum Carbides in Alkaline and Acid Electrolytes." *ChemElectroChem*, 2016, **3**, 1686-1693.
- **B. M. Tackett**, Y. C. Kimmel and J. G. Chen. "Metal-Modified Niobium Carbides as Low-Cost and Impurity-Resistant Electrocatalysts for Hydrogen Evolution in Acidic and Alkaline Electrolytes." *Int. J. Hydrogen Energy*, 2016, **41**, 5948-5954.
- S. Bhavsar; **B. Tackett** and G. Vesper. "Evaluation of iron- and manganese-based mono- and mixed-metallic oxygen carriers for chemical looping combustion." *FUEL*, 2014, **136**, 268-279.

PRESENTATIONS

- "Low-cost Electrocatalysts for Water Electrolysis, Based on Transition Metal Carbides and Nitrides." North American Catalysis Society Meeting, Denver, CO. 2017
- "Trends in Hydrogen Evolution Reaction Activity Among Metal Modified Carbide Thin Films and Powders." AIChE National Conference, San Francisco, CA. 2016.
- "Nanocrystalline tungsten alloys for self sharpening kinetic energy penetrators." REU Research Symposium, Stony Brook University, NY. 2013.
- "Ni-Fe Mixed Oxides for Chemical Looping Combustion and Chemical Looping Partial Oxidation of Methane." Omega Chi Epsilon undergraduate poster competition – University of Pittsburgh, PA. 2013.

HONORS AND AWARDS

- University of Pittsburgh: University Scholar award (top two percent of class) **2011 – 2013**
- II-VI Foundation Scholarship **2011 – 2012**
- University of Pittsburgh: Stuart Memorial Scholarship (departmental award) **2012**
- University of Pittsburgh: Omega Chi Epsilon poster contest winner **2012**
- University of Pittsburgh: Lubrizol Foundation Scholarship **2013**
- Keynote Speaker at Swanson School of Engineering Graduation **2013**
- NSF Graduate Research Fellowship Honorable Mention **2014**
- Columbia University: Presidential Fellowship **2014 – Present**
- Columbia University: Carl Gryte Fellowship **2016**
- North American Catalysis Society: NAM25 Conference Kokes Award **2017**
- DOE Office of Science Graduate Student Research Program Award **2017 – 2018**

RELEVANT WORK EXPERIENCE

MATERIALS SCIENCE/CHEMICAL RESEARCH CO-OP

Mine Safety Appliances, Cranberry, PA

Jan. – May 2011 & Aug. – Dec. 2011

- Set up, carried out, and analyzed service life tests of chemical cartridges (wet lab work)
- Resolved product complaints from the field using analytical chemistry techniques
- Extensive use of DSC, TGA, and FTIR for determining composition of materials
- Extensive use of tensile tester and DMA for mechanical analysis of materials
- Organized and presented results of over 25 tests using MS Excel and Word (and VBA)

**PROCESS METALLURGY INTERN – Grain-Oriented Electrical Steel
ATI Allegheny Ludlum, Leechburg, PA**

May – Aug. 2012

- Organized mill experiments for steel insulation improvement
- Defined alternate operating conditions to save \$350k/year in cost
- Performed over 30 surface analyses using SEM
- Collected, analyzed, and reported data using Minitab, MS Excel, MS Word, MS PowerPoint

TEACHING EXPERIENCE

GRADUATE TEACHING ASSISTANT

Undergraduate Chemical Engineering and Applied Chemistry Lab

Jan. 2017 – May 2017

- Instructed groups of 5 senior ChemE students on a fixed bed adsorption reactor twice weekly
- Held review sessions on adsorption kinetics and theory
- Graded bi-weekly lab reports
- Created exam questions based on course goals and student experimental results

Reactor Design and Kinetics – Columbia University

Jan. 2016 – May 2016

- Assisted students with in-class problem solving in a “flipped classroom” setting
- Held 2 office hours weekly
- Graded weekly homework for 40 students

STEM LAB TUTOR

Double Discovery Center – Columbia University

Sept. 2014 – May 2015

- Tutored New York City high school students in STEM fields during weekly 2hr sessions
- Provided one-on-one and small group (4-5 students) instruction
- SAT and New York state Regent test prep

UNDERGRADUATE TEACHING ASSISTANT

Organic Chemistry I – University of Pittsburgh

Fall 2012 & Fall 2013

- Led weekly organic chemistry recitation (25-30 students)
- Created student worksheets based on professor’s notes
- Used examples to simplify complex topics to increase students’ understanding
- Provided additional one-on-one tutoring as requested

VOLUNTEER / CLUB ACTIVITIES

COLUMBIA CHEM.E. GRAD. ORGANIZATION -- President

Feb. 2016 – Present

- Oversee academic, social, and community outreach programming within the department
- Coordinate student evaluations of new faculty candidates
- Facilitate communication between faculty and grad student population (50 PhD, 75 MS)

COLUMBIA CHEM.E. GRAD. ORGANIZATION -- Academic Chair

Feb. 2015 – Feb. 2016

- Coordinate 2-3 academic development events per semester for graduate students
- Organize recruitment weekend for accepted Ph.D. students
- Act as liaison between graduate students and faculty

PITT CLUB CROSS COUNTRY TEAM – President/Coach

Aug. 2012 – Dec. 2013

- Organize daily team practices and write training plan for 30-60 members
- Organize travel logistics for team members at 4-5 meets during each fall

- Compete with team and attend daily practice

OMEGA CHI EPSILON (Pitt) – Treasurer

Jan. – May 2013

- Organize travel logistics to conferences
- Manage club bank account
- Write and defend proposals for university funding