

# Stephen Crowley

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## OBJECTIVE

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Industrious chemical engineering graduate with several years of analytical chemistry research experience at Takeda Pharmaceuticals. I am seeking to apply my unique skill set in the area of process design and chemical engineering fundamentals to the development of novel chemicals.

## EDUCATION

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**Ph. D. in Chemical Engineering**, City College of New York, CUNY, New York City, NY, USA,  
October 2016

Thesis: Morphology dynamics of precious metal catalysts for the steam reforming of oxygenated fuels

Advisor: Dr. Marco J. Castaldi

**B. A. in Chemistry and Mathematics with Honors**, College of the Holy Cross, Worcester, MA,  
USA, May 2009

## RESEARCH EXPERIENCE

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Université Catholique de Louvain, Louvain-la-Neuve, Belgium

*Postdoctoral Visiting Researcher*, Materials and Process Engineering Unit (IMAP) of the Institute of Mechanics, Materials and Civil Engineering (IMMC), November 2016 – January 2017

- Characterized novel Ni-based catalyst for methane reforming.
- Performed intrinsic kinetic study for the catalytic steam reforming of methane.
- Developed simulation of reaction taking account on non-idealities in transport and temperature gradients.

City College of New York, CUNY, New York City, New York, USA

*Graduate Research Assistant*, Department of Chemical Engineering, August 2012 – Present

- Synthesized and characterized bimetallic heterogeneous precious metal catalysts for steam reforming oxygenated fuels.
- Performed catalytic ethanol steam reforming using isotope-labeled reactants to gain insight into dominant reaction pathways and the contribution of each metal to reforming behavior.
- Developed models of thermodynamic and kinetic parameters for the catalytic steam reforming of ethanol using Matlab.
- Catalyst performance analysis by gas chromatography (GC) equipped with thermal conductivity detector (TCD) with simultaneous X-ray absorption fine structure (XAFS) analysis using the National Synchrotron Light Source I at Brookhaven National Laboratory – monitored *in situ* and *operando* changes to the catalyst surface during reaction.

- Purchased and maintained analytical equipment including an Agilent 7890B GC system with TCD, ECD, and Agilent 5977A mass selective detector (MSD), Inficon 3000 Micro GC, and Quantachrome ChemBET Pulsar TPR/TPD Automated Chemisorption Flow Analyzer.

Golden Renewable Energy, Yonkers, New York, USA

*Research Collaborator*, January 2015 – Present

- Performed onsite emissions testing on a commercial scale renewable diesel fuel and syngas production reactor processing waste plastics grades 1-7.
- Determined the composition of syngas produced during processing to evaluate energy content.
- Developed GCMS method to detect and quantify liquid product fraction of commercial scale renewable diesel fuel and syngas production reactor.

Takeda Pharmaceuticals (Millennium: The Takeda Oncology Company), Cambridge, Massachusetts, USA

*Research Associate*, Analytical Development: Small Molecules, June 2009 – August 2012

- Developed analytical methods to characterize new oncology drug candidates using GxP laboratory practices. Used Empower 2 and Chemstation for the control of high performance liquid chromatography (HPLC), GC with flame ionization detector (FID) and MSD, and Karl Fischer moisture analysis instruments – reduced analysis time by a factor of at least two.
- Contributed to the development of a dissolution method for solid oral formulations of new drug candidates – allowed for rapid determination of variability between batches and provided a basis for *in vivo* kinetic modeling.
- Performed lab-batch testing for preclinical and clinical drug products – contributed to the advancement of new drug candidates through all phases of clinical trials.
- Container-closure system study performed on pediatric oral formulation of drug candidate. Unanimous decision to proceed with one particular configuration based on my recommendation. Received internal recognition for outstanding work on this project within the Millennium Star Award Program.

College of the Holy Cross, Worcester, Massachusetts, USA

*Research Assistant*, Department of Chemistry, May 2007 – May 2009

- Developed a method for rapid determination of coating performance in capillary electrophoretic (CE) separations – reduced qualification time by a factor of six.
- Contributed to the development for a universal coating for microchip and CE separations using a Beckman-Coulter PACE/MDQ Capillary Electrophoresis instrument with UV detection– resulted in consistent, reproducibly uniform coatings allowing for higher throughput analyses.
- Trained new lab members on the various equipment used in day-to-day laboratory activities.

## ACADEMIC AWARDS

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- 2016 - Poster Award Winner at The Catalysis Society of Metropolitan New York Annual Symposium at Rutgers University
- 2015 - Invited Scholar, American Chemical Society Summer School on Green Chemistry & Sustainable Energy
- 2015 - Winner of the Richard J. Kokes Travel Award to attend the 24<sup>th</sup> North American Catalysis Society Meeting
- 2015 - The Grove School of Engineering Travel Grant to attend the 249<sup>th</sup> American Chemical Society Annual Meeting and Exposition
- 2015 - Winner of the Student Development Fund Travel Grant to attend The Catalysis Society of Metropolitan New York Annual Symposium at the New Jersey Institute of Technology
- 2014 - Winner of the CCNY Internal Competition to attend the 65<sup>th</sup> Lindau Nobel Laureate Meeting
- 2014 - Winner of a National Science Foundation Travel Award, 8<sup>th</sup> International Conference on Environmental Catalysis
- 2014 - Winner of the New York Intercollegiate Conference for Chemical Engineers Poster Competition
- 2014 - Winner of the Student Development Fund Travel Grant to attend The Catalysis Society of Metropolitan New York Annual Symposium
- 2013 - Winner of the Grove School of Engineering Travel Grant to attend the American Institute of Chemical Engineers Annual Meeting
- 2012 - Featured in the CCNY Division of Science Annual Report 2011-2012 for uniting the sciences and engineering through social events
- 2009 - Chemistry Major with Honors
- 2008 - William Bennett Memorial Scholarship
- 2005 - American Hellenic Educational Progressive Association Scholarship
- 2005 - College of the Holy Cross Book Award

## TEACHING EXPERIENCE

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October 2015 – Present

Central Park Tutors, New York City, New York, USA

*Private Tutor, Chemistry*

- Met individually with high school students needing one-on-one attention in order to advance in subjects ranging from General Chemistry through AP Chemistry – resulted in increased test scores and improved understanding of concepts.
- Developed review material encompassing conceptual and applied principles commonly found in high school level chemistry courses.

January 2014 – May 2014

City College of New York, CUNY, New York City, New York, USA

*Teaching Assistant, CHE 346: Unit Operations 2*

- Supervised and instructed third-year undergraduate students during the laboratory component of this course on fluid dynamics and heat exchange.
- Graded homework assignments, held office hours, and gave recitations for specialized tutoring sessions.

August 2013 – December 2013

City College of New York, CUNY, New York City, New York, USA

*Laboratory Instructor*, CHEM 243: Quantitative Analysis

- Supervised and instructed second- and third-year undergraduate students during the laboratory component of this course on the quantitative determination and statistical analysis of analytes in various sample media.
- Graded laboratory reports, held office hours, and gave recitations for specialized tutoring sessions.

January 2008 – May 2008

College of the Holy Cross, Worcester, Massachusetts, USA

*Teaching Assistant*, CHEM 231: Equilibrium and Reactivity

- Supervised and instructed second-year undergraduate students during the laboratory component of this course on phase and chemical equilibria including thermodynamic properties and gas laws.

## PUBLICATIONS

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1. **S. Crowley** and M. J. Castaldi, “Mechanistic insights into catalytic ethanol steam reforming using isotope-labeled reactants” *Angewandte Chemie*, 2016, DOI: 10.1002/anie.201604388
2. A. Simson, **S. Crowley**, and M. J. Castaldi, “The impact of sulfur on ethanol steam reforming” *Catalysis Letters*, 1-12, 2016, DOI: 10.1007/s10562-016-1749-y
3. S. Zhao, Y. Li, E. Stavitski, R. Tappero, **S. Crowley**, M. J. Castaldi, D. N. Zakharov, R. G. Nuzzo, A. I. Frenkel, and E. A. Stach, “*Operando* characterization of catalysts through use of a portable microreactor” *ChemCatChem*, 7, 3683-3691, 2015, DOI: 10.1002/cctc.201500688

## CONFERENCE PRESENTATIONS

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1. **S. Crowley** and M. J. Castaldi, “Mechanistic insights on catalytic ethanol steam reforming” American Institute of Chemical Engineers Annual Meeting, San Francisco, California, USA, November 2016.
2. **S. Crowley** and M. J. Castaldi, “Isotope-labeled ethanol steam reforming over a Rh/Pt catalyst: mechanistic insights through tracking individual atoms” The Catalysis Society of Metropolitan New York Annual Symposium, New Brunswick, New Jersey, USA, March 2016.

3. **S. Crowley**, Y. Li, A. Frenkel, and M. J. Castaldi, “*In Situ* XAFS Analysis of Precious Metal Catalysts during Ethanol Steam Reforming” American Institute of Chemical Engineers Annual Meeting, Salt Lake City, Utah, USA, November 2015.
4. **S. Crowley**, Y. Li, A. Frenkel, and M. J. Castaldi, “*In Situ* X-ray Absorption Fine Structure (XAFS) of Precious Metal Catalysts during Ethanol Steam Reforming” 24<sup>th</sup> North American Catalysis Society Meeting, Pittsburgh, Pennsylvania, USA, June 2015.
5. **S. Crowley**, Y. Li, A. Frenkel, and M. J. Castaldi, “In Situ X-ray Absorbance Fine Structure (XAFS) of Precious Metal Catalysts during Ethanol Steam Reforming” 249<sup>th</sup> American Chemical Society National Meeting and Exposition, Denver, Colorado, USA, March 2015.
6. **S. Crowley**, Y. Li, A. Frenkel, and M. J. Castaldi, “In Situ X-ray Absorbance Fine Structure (XAFS) of Precious Metal Catalysts during Ethanol Steam Reforming” The Catalysis Society of Metropolitan New York Annual Symposium, Newark, New Jersey, USA, March 2015.
7. **S. Crowley** and M. J. Castaldi, “Morphology Dynamics of Precious Metal Catalysts for Use in Steam Reformation of Oxygenated Fuels” International Conference on Environmental Catalysis, Asheville, North Carolina, USA, August 2014.
8. **S. Crowley** and M. J. Castaldi, “Morphology Dynamics of Precious Metal Catalysts for Use in Steam Reformation of Oxygenated Fuels” New York Intercollegiate Conference for Chemical Engineers, New York City, New York, USA, March 2014.
9. **S. Crowley** and M. J. Castaldi, “Morphology Dynamics of Precious Metal Catalysts for Use in Steam Reformation of Oxygenated Fuels” The Catalysis Society of Metropolitan New York Annual Symposium, Bethlehem, Pennsylvania, USA, March 2014.
10. **S. Crowley** and M. J. Castaldi, “Morphology Dynamics of Precious Metal Catalysts for Use in Steam Reformation of Oxygenated Fuels” American Institute of Chemical Engineers Annual Meeting, San Francisco, California, USA, November 2013.
11. Z. Thompson, **S. Crowley**, and J. Adamson, “Dissolution Method Development of a Poorly Soluble API” Eastern Analytical Symposia, Somerset, New Jersey, USA, November 2011.
12. A. M. Stingel, L. Sussman, **S. Crowley**, and K. A. Frederick, “Rapid Method for Assessing Coating Performance in Capillary Electrophoresis” The Pittsburgh Conference, Orlando, Florida, USA, March 2010.
13. **S. Crowley**, K. E. Swords, and K. A. Frederick, “Development of a Rapid Method for Assessing Coating Performance in CE” The Pittsburgh Conference, Chicago, Illinois, USA, March 2009.
14. A. Buga, **S. Crowley**, and K. A. Frederick, “Universal Surface Coating for Microfluidic Chips” The Pittsburgh Conference, Chicago, Illinois, USA, March 2009.
15. K. A. Frederick, **S. Crowley**, A. Dhamko, and K. E. Swords, “Evaluation of a Universal Surface Coating for Microfluidics” The Pittsburgh Conference, New Orleans, Louisiana, USA, February 2008.