

RICHARD T. CIMINO

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EDUCATION

PhD, Chemical and Biochemical Engineering, Rutgers University, New Brunswick, NJ | 10/2016 | GPA: 3.8

M.S., Chemical and Biochemical Engineering, Rutgers University, New Brunswick, NJ | 10/2013 | GPA: 3.8

B.S., Chemical and Biochemical Engineering, Rutgers University, New Brunswick, NJ | 5/2011 | GPA: 3.72

Teaching Preservice Program, Rutgers University, New Brunswick, NJ | 3/2014 |

TEACHING AND MENTORING EXPERIENCE

Lecturer, Experiential Engineering Education (ExEEd) | Rowan University | 7/1/2018 – Present

Since the summer of 2018, I have been a Lecturer at Rowan University teaching freshman and sophomore level engineering clinics. In this role, I have continued to teach basic engineering design principles and engineering communication. In addition to teaching four classes a semester, I also conduct engineering education research.

¾ Time Instructor, Experiential Engineering Education (ExEEd) | Rowan University | 9/2017-6/30/2018

In this role, I have introduced over 60 students to basic engineering design principles and engineering communication and have helped to lay the foundation for their success in the engineering profession. I have developed active-learning based coursework both individually and as a part of teaching teams aimed at accomplishing these goals, and conducted education research in the Spring aimed at evaluating our engineering ethics education.

Courses I have taught at Rowan:

Freshman Engineering Clinic – 2 semesters, 2 sections an introduction to the engineering profession and design principles, as well as basic engineering skills

Sophomore Engineering Clinic – 3 semesters, 3 sections an in-depth, project-based course aimed at teaching design methodology and written communication

Adjunct Professor | Monmouth University | 9/2017 – 5/2018

I have formerly been employed as an adjunct at Monmouth University in the Department of Chemistry and Physics. There, I taught general chemistry laboratory and Discovery and Thinking in the Sciences (a general science course for non-science majors). In these roles, I have introduced students from diverse backgrounds to the basics of chemistry practice and helped to increase their scientific literacy.

Courses I have taught at Monmouth:

General Chemistry Laboratory – 1 semester, 2 sections

Discovery and Thinking in the Natural Sciences – 1 semester, 2 sections

Course Support – Kinetics and Reactor Design | Rutgers University | 1/2017-5/2017

I acted as a mentor and guest-lecturer for Rutgers' graduate level Kinetics and Reactor Design. In this role, I have provided out-of-classroom mentoring and support to the teaching assistant and I am on-call to give guest lectures in the event that the professor is unable to do so. To date I have provided one 3-hour lecture.

Teaching Assistant | Rutgers University | 9/2012-5/2016

For the majority of my PhD studies, I served as a teaching assistant for several chemical engineering classes taught at Rutgers. As a teaching assistant, I served 70+ undergraduate or graduate students a semester. My duties included developing course materials, weekly and semester-long evaluations of our student's work, providing office hours and grading.

Courses I have participated in:

Kinetics and Reactor Design: 4 Semesters, Graduate Level. 1 Semester, Undergraduate Level

Transport Phenomena (Fluid Mechanics): 2 Semesters, Graduate Level

Fundamentals of Nanoscale Thermodynamics and Transport: 1 semester

Research Mentoring| 9/2012-8/2017

I have had the great pleasure to mentor undergraduate (5) students during planned summer research experiences (REUs) throughout my entire PhD. Many of these students have gone on to top universities in the country including MIT and Princeton. In addition, I have also mentored several masters and PhD students in the Neimark research group.

Recitation Mentor | Rutgers University | 9/2010-5/2011

During the senior year of my undergraduate studies, I had the privilege of leading mandatory weekly recitation sessions in precalculus mathematics. In these sessions, I was in charge of mentoring, evaluating and reviewing material with 30+ college students per semester to help them prepare for comprehensive examinations in their regular class periods.

Peer Mentor| Rutgers University | 5/2009-5/2010

During my sophomore and junior years of my undergraduate studies, I offered in-classroom support to students taking calculus at Rutgers as a "peer mentor." In this position, I was in charge of answering student questions and helping them through the problems, while also providing technical support to the Recitation Mentor who ran the class (usually a doctoral candidate in the Math Department).

RESEARCH EXPERIENCE

PI | Rowan University | 1/2018-Present

Implicit Bias and Ethical Decision Making in a Freshman Engineering Clinic Course: I was recently awarded funding from Rowan University to conduct a study on implicit bias in the engineering classroom. In this study, my colleagues and I will investigate the link between implicit and explicit bias and their effects on student reasoning and decision making about issues of diversity and inclusion in an engineering context.

The study will investigate the following research questions:

- What kinds of informal reasoning do engineering students use to discuss issues of diversity and inclusion?
- How are implicit and explicit biases manifested in the ethical decision-making processes of first year engineering students?
- How do the observed biases and approaches to informal reasoning change as a function of student gender identity?

Effectiveness of Ethical Interventions in a Freshman Engineering Clinic Course: I am currently conducting a survey and intervention-based investigation aimed at evaluating the ethics education in Rowan University's freshman engineering clinic (FEC II) course. The purpose of this IRB-approved study is to determine the effectiveness of several ethical interventions (activities) on the moral development and ethical awareness of freshman engineering students and on their ability to make ethical decisions. A pilot study has already been completed, which has been published in the conference proceedings of the 10th annual FYEE conference.

Objectives

Characterize the moral development of engineering students

- How do the ethical outlooks of first year engineering students vary?
- How do the ethical and moral outlooks of engineering students change as they progress throughout the first-year engineering curriculum?

Characterize the ability of engineering students to make ethical decisions

- What do engineering students consider important in ethical problem resolution?

Assessment of the effect of interventions

- Can ethical and moral decision-making be improved through new teaching methods?

Potential Impact

- Understanding of students' strategies for solving ethical dilemmas will help the researchers enhance existing coursework by adding/modifying methods to teach decision making strategies.

Postdoctoral Research Fellow | Rutgers University | 10/2016 – 8/2017

Advisor: Dr. Alexander V. Neimark

Advanced methods for porous materials characterization: Developed a method to accurately calculate the isosteric heat of adsorption of simple fluids on porous and nonporous materials using density functional theory kernels.

Graduate Researcher | Rutgers University | 8/2011-9/2016

- **Doctoral Advisor:** Dr. Alexander V. Neimark
 - Dissertation Title: Molecular Modeling of Adsorption of Simple and Complex Fluids on Nanoporous Materials for Characterization
- Ongoing collaboration with industrial research partners at DuPont (Wilmington, DE) through which my innovative molecular-modeling based approach has enhanced the understanding of polymer interaction chromatography and serves as a guide to experimentalists in the field.

Development a unified model of polymer interaction chromatography. I have developed a model of polymer interaction chromatography based on a fundamental thermodynamic approach utilizing Monte Carlo simulations

and classical mass transfer dynamics. This model is capable of describing the three primary modes of liquid chromatographic elution: SEC, LAC, and liquid chromatography at critical conditions (LCCC) with minimal parameterization. This model can be used by chromatographic practitioners to predict the order of elution of series of polymer chains, or to determine the critical conditions of adsorption for chains of similar chemistry and is suitable for porous and nonporous stationary phases.

- Ongoing collaboration with materials characterization experts Dr. Matthias Thommes and Dr. Katie Cychosz at Quantachrome Instruments (Boynton Beach, FL), wherein my analytical and simulation based methods for pore structure characterization have been integrated into commercially available software utilized by scientists worldwide

Development of DFT kernels. I have developed adsorption kernels that provide a new level of accuracy when characterizing the pore size distribution, surface area, and volume of hierarchically structured micro-mesoporous carbons and are based in fundamental understanding of fluid adsorption physics. Kernel adsorbate gasses include N₂, Ar, and CO₂.

Analysis of Scanning Isotherms. I have implemented novel methods for porous materials characterization utilizing scanning adsorption isotherms. These methods offer an advanced level of understanding of the topology and texture of porous media and aid in distinguishing the orderliness of the material.

Johnson & Johnson Consumer Products | R&D Intern | 6-8/2010

Designed and performed test methods to analyze the heat and mass transfer properties associated with sanitary pads utilizing a controlled environment and mechanized sweating-hotplate. Created a program to mimic the effect of low-level exercise on the interfacial area between the pad and wearer. Cataloged thermal and evaporative resistance data on pad raw materials. This information has been used by researchers at J&J to help produce breathable, lightweight and absorbent sanitary pads designed for increased comfort.

GRANT AND PROPOSAL WRITING EXPERIENCE

Rowan REDI Grant for Research in Educational Diversity and Inclusion | 6/2018 – Successful/Accepted

National Research Council Research Associateship Program | 5/2016 – Successful/Declined

TECHNICAL SKILLS

Computer Programming Languages: FORTRAN, C++, MATLAB, Python, bash scripting

Computer OS and Codes: Linux, Mac, Windows, RASPA, HRMC, In house codes (DFT, Sorsim, Chainbuild)

Computational Techniques: Density Functional Theory, Monte Carlo Simulation, Hybrid Reverse MC

Experimental Techniques: Gas adsorption (Autosorb 1), Wetspinning carbon nanotube fibers

Statistics, Survey and Design Techniques: Qualtrics, parametric design, factorial design, steepest ascent, central composite design, ANOVA

PUBLICATIONS

Peer reviewed journal articles and conference proceedings

- R. Cimino, S. C. Streiner. Effectiveness of Ethical Interventions in a First-Year Engineering Course: A Pilot Study. In Proceedings of the 10th Annual First Year Engineering Education Conference (FYEE), Glassboro, NJ, July 25-26, 2018. (accepted)
- N. Chotimah., A.D. Putri, Y. Ono, S. Kento, Y. Hattori, S. Wang, R. Futamura, K. Urita, F. Vallejos-Burgos, I. Moriguchi, M., R. Cimino, A. V. Neimark, T. Sakai, K. Kaneko. Nanoporosity Change on Elastic Relaxation of Partially Folded Graphene Monoliths. *Langmuir* **33** (51) p.14565–14570 (2017)
- R. Cimino, P. Kowalczyk, P. Ravikovitch, A. V. Neimark. Calculation of the Isosteric Heat from the of Adsorption Isotherm Measured at One Temperature. *Langmuir* **33** (8) p. 1769-1779 (2017)
- R. Cimino, C. Rasmussen, Y. Brun, A. V. Neimark. Mechanisms of Chain Adsorption on Porous Substrates and Critical Conditions of Polymer Chromatography. *Journal of Colloid and Interface Science* **481** p. 181-193 (2016)
- C. Balzer, R. Cimino, G. Yu. Gor, A. V. Neimark, G. Reichenauer. Deformation of Microporous Carbons during N₂, Ar, and CO₂ Adsorption: Insight from the Density Functional Theory, *Langmuir* **32** p.8265-8274 (2016)
- R. Cimino, C. Rasmussen, Y. Brun, A. V. Neimark. Critical conditions of polymer adsorption and chromatography on nonporous substrates, *Journal of Colloid and Interface Science* **474** p. 25-33 (2016)
- R. Cimino, C. Rasmussen and A. V. Neimark, Communication: Thermodynamic analysis of critical conditions of polymer adsorption, *J. Chem. Phys.*, **139** (20) p.201101-1-4 (2013)
- R. Cimino, K. Cychosz, M. Thommes and A. V. Neimark, Experimental and theoretical studies of scanning adsorption–desorption isotherms, *Colloids Surf. A: Physicochem. Eng. Aspects*, **437** (SI) p.76-89 (2013)
- K. Cychosz, X. Guo, W. Fan, R. Cimino, G. Gor, M. Tsapatsis, A. V. Neimark, and M. Thommes, Characterization of the Pore Structure of Three-Dimensionally Ordered Mesoporous Carbons Using High Resolution Gas Sorption, *Langmuir*, **28** (34) p.12647-12654 (2012)

CONFERENCE ORGANIZATION

Chief secretary of Characterization of Porous Materials 7 (CPM-7) | 5/2015

Coordinated all conference communication and event registration for over 100 participants. Operated conference website and handled all payments.

PRESENTATIONS

Podium Talks

“Effectiveness of Ethical Interventions in a First-Year Engineering Course: A Pilot Study,” at FYEE 10, Glassboro, NJ, 2018

"Calculation of the Isothermic Heat of Adsorption using Quenched Solid Density Functional Theory," at AIChE Annual Meeting, San Francisco, CA 2016

"Characterization of Micro-Mesoporous Carbons By High-Pressure CO₂ Adsorption with Hybrid QSDFT Methods," at AIChE Annual Meeting, Salt Lake City, UT 2015

"Critical conditions of Polymer Adsorption on Porous Substrates," at AIChE Annual Meeting, Atlanta, GA 2014

"Investigation of the Critical Point of Adsorption of Polymers on Porous Materials," at AIChE Annual Meeting, San Francisco 2013

"Characterization of Novel Ordered Mesoporous Carbons," at AIChE Annual Meeting, Pittsburgh 2012

Poster Presentations

Characterization of Micro-Mesoporous Carbons by High-Pressure N₂, Ar, and CO₂ Adsorption with Hybrid QSDFT Methods" Fundamentals of Adsorption (FOA)12, May 2016

"Novel Hybrid NL-QSDFT Kernels for High Pressure CO₂ Adsorption on Carbons" Characterization of Porous Materials 7(CPM-7), May 2015

"Simulation of the Critical Conditions of Polymer Adsorption on (non) Porous Substrates" Characterization of Porous Materials 7(CPM-7), May 2015

"Theoretical and Experimental Studies of Scanning Isotherms" Characterization of Porous Materials 6 (CPM-6), May 2012

AWARDS AND ACKNOWLEDGEMENTS

CBE Graduate Research and Scholarship Award 5/13/17

School of Engineering Fellowship, Rutgers University 9/2015

Bevier Fellowship, Rutgers University 9/2011

Tau Beta Pi Engineering Honors Society (NJ Beta Chapter) 10/2009

REFERENCES

References available upon request