KRISTOPHER S. BROWN

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OBJECTIVE

I work daily with distributed high-performance computing, applied mathematics, database engineering, and data analytics infrastructure. My PhD addresses systemic challenges with data sharing, transparency of methodologies, and automation in computational science.

EDUCATION

PhD in Chemical Engineering 2021 (expected)
Stanford University

Bachelor of Engineering in Chemical Engineering 2015
Bachelor of Science in Chemistry 2014
Dartmouth College, *Magna cum laude*

HONORS

National Defense Science and Engineering Graduate (NDSEG) Fellowship 2017 - Present

Applied Category Theory: Bridging Theory & Practice at NIST (invited guest) 2018

CS230 Deep Learning: 1st Prize Poster Award (Stanford University) 2018

James B. Reynolds Scholar 2015

American Chemical Society National Scholar 2012 - 2014

Phi Beta Kappa and Tau Beta Pi (Vice President of NH-B Chapter) 2014

Citation for Outstanding Performance as a Teaching Assistant (Dartmouth College) 2014

Chemistry Faculty Book Award winner (Dartmouth College) 2014
- For exemplary academic performance and intellectual curiosity

RESEARCH EXPERIENCE

Graduate Research Assistant, Stanford University Winter 2016 - Present
Advisor: Jens Norskøv

· Builds models for chemical systems that adapt recent advances in ML (e.g. graph-convolutional and message-passing networks) to interface with chemistry data
· Designs declarative interfaces for data integration to facilitate data sharing between scientists with overlapping data but different frames of reference.
· Develops tools for scientists modeling complicated phenomena to generate relational databases from a natural (i.e. SQL-less) declaration of scientific facts and to naturally query and publicly communicate their knowledge base.
· Applies graph-theoretic techniques to give high-level structure to simulation data in order to model complex phenomena at electrochemical interfaces

Visiting Scholar, École Polytechnique Fédérale de Lausanne Fall 2015 - Summer 2016
Advisor: Jeremy Luterbacher

· Constructed multi-scale models to interpret the impact of synthesis conditions on catalyst material properties

Visiting Scholar, Helmut Schmidt Universität Summer 2015
Advisor: Alexander Fay

· Applied control theory to process simulation data to model disturbance propagation throughout chemical plants

INDUSTRY EXPERIENCE

Research and Development Engineering Intern Summer 2014
Bayer CropScience

- As the facility's sole engineer, collaborated with biologists to design and construct novel bioreactor systems.
- Designed, assembled, and implemented dynamic fluid systems for managing a sterile bioreactor network.

Process Engineering Intern Summer 2013
Midori Renewables, Inc.

- Modeled large-scale fuel production from waste biomass; presented findings to CEO during weekly briefings.

SKILLS AND INTERESTS

Programming Languages	Python (6 yr), SQL (3 yr), Haskell (3 yr), Java (1 yr), MATLAB (6 yr)
Spoken Languages	Spanish, German, French (intermediate level)
Software	VASP, Quantum Espresso, Gaussian 09, COMSOL, SolidWorks, Aspen Plus
Extracurricular Activities	Tau Beta Pi, Dartmouth Undergraduate Journal of Science (Writer), Dartmouth Quizbowl (Captain), Concert piano and music composition

PUBLICATIONS

A chemical analogue for the convolution operation 2018
Brian Rohr, Adwitya Rohan, Michael Statt, Kristopher S. Brown, Stefano Ermon

- *In Preparation*

Hydrogen intercalation at Pd and PdAu electrochemical interfaces 2018
Kristopher S. Brown, Alan Landers, Jeremy Feaster, Chris Hahn, Karen Chan, Jens K. Nørskov, Thomas F. Jaramillo

- *In Preparation*

Solvent-adsorbate effects at electrochemical interfaces 2018
Thomas K. Ludwig, Joe Gauthier, Stefan Ringe, Kristopher S. Brown, Karen Chan, Jens K. Nørskov

- *In Preparation*

The effect of pH on the electrochemical reduction of CO and CO2 towards C2+ products on stepped copper 2018
Xinyan Liu, Philomena Schlexer, Jianping Xiao, Yongfei Ji, Lei Wang, Robert Sandberg, Michael Tang, Kristopher S. Brown, Chris Hahn, Thomas F. Jaramillo, Jens K. Nørskov, Karen Chan

- Nature Catalysis *Under Review*

Simulation of Gas- and Liquid-Phase Layer-By-Layer Deposition of Metal Oxides by Coarse-Grained Modeling 2018
Kristopher S. Brown, Chiara Saggese, Benjamin P. Le Monnier, Florent Héroguel, Jeremy S. Luterbacher

- Journal of Physical Chemistry C, Volume 122, Issue 12

Catalyst stabilization by stoichiometrically limited layer-by-layer overcoating in liquid media 2017
Florent Héroguel, Benjamin P. Le Monnier, Kristopher S. Brown, Juno C. Siu, Jeremy S. Luterbacher

- Applied Catalysis B, Volume 218, Issue 5

Liquid-phase tuning of porous PVDF-TrFE film on flexible substrate for energy harvesting 2017
Dajing Chen, Kaina Chen, Kristopher Brown, Annie Hang, and John X. J. Zhang

- Applied Physics Letters, Volume 110, Issue 15

TEACHING ASSISTANTSHIPS

Stanford University (Energy: Chemical Transformations for Production, Storage, and Use)	Winter 2018
Thayer School of Engineering at Dartmouth College (Chemical Engineering Fundamentals)	Fall 2015
Dartmouth College (Organic Chemistry)	Fall 2012